### **BSc**

### Syllabuses and Regulations (4-year curriculum)

2017-18

**Faculty of Science**The University of Hong Kong

### **General Information**

This booklet includes information on:

#### BSc Degree curriculum and graduation requirements

#### > List of courses and descriptions

A full list of Science courses and descriptions include information on course code, title, credit value, contents, semester offered, teaching and learning activities, assessment methods and grade descriptors.

#### Majors & Minors

Details of the Science Majors and Minors available for students.

#### > Degree regulations

Rules that cover curriculum requirements and progression in curriculum, selection of courses, assessment, advanced standing, grading system and degree honours classification.

#### > Teaching weeks

Teaching weeks show the dates of semesters, University holidays, revision and examination periods.

Further Information detailing instructions on the selection of courses, grading, graduation requirements, honours classification, application for advanced standing and exemption, etc, can be found in the *Handbook for BSc Students* available at http://www.scifac.hku.hk/ug/current

Updates on BSc Syllabuses and Regulations can be found at http://webapp.science.hku.hk/sr4/servlet/enquiry

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**BSc Degree Curriculum and** 

**Graduation Requirements** 

#### SECTION I BSc Degree Curriculum and Graduation Requirements

#### 1. A BSc Degree Curriculum

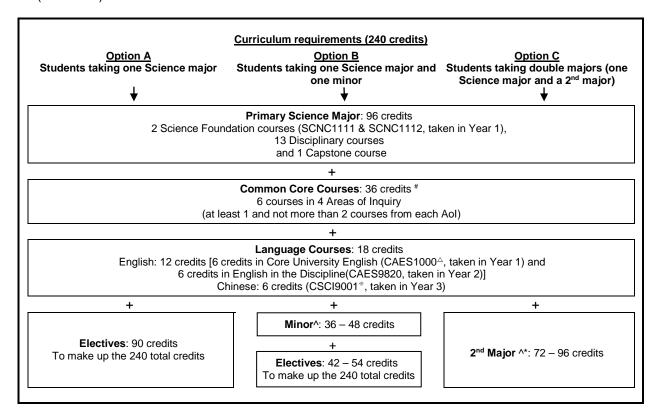
The Faculty of Science offers a number of Science majors leading to the award of a BSc degree.

All students admitted to the 6901 BSc programme under the 4-year curriculum are required to complete at least one Science major out of the 16 Science majors as the primary major for the award of the BSc degree. In addition to the primary Science major, students may take a second major or a minor in a Science or non-Science discipline. Students should note that some non-Science majors and minors may require students to have achieved a minimum academic result before they are allowed to enroll in them.

### (a) A typical BSc curriculum for students admitted under the 4-year '2012 curriculum' in 2012-13 or thereafter

To complete the BSc degree curriculum, you have to pass at least 240 credits, equivalent to 40 6-credit courses, normally spread over 4-years of full-time study. A BSc curriculum typically comprises:

- 16 courses for the Science major including 2 Science Foundation courses, Disciplinary courses and capstone courses (96 credits)
- 2 English courses and 1 Chinese course for university language requirements (18 credits)
- 6 common core courses in 4 Areas of Inquiry (36 credits)
- A choice of 15 courses as elective courses, or to fulfill the requirements of a minor or a second major (90 credits)



#### Notes:

- # Student must select at least one and not more than two courses from each Area of Inquiry with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits. Common Core courses should be completed normally within the first three years of study.
- Students who have been admitted to Year 1 in 2015-16 or thereafter and have achieved the following qualifications shall be exempted from taking CAES1000 Core University English and should take a 6-credit elective course in lieu:
  - 5\*\* on the HKDSE English Language Paper
  - tested by CAES to be of a native English speaker standard
  - holder of Bachelor's degree from an English-medium university
  - achieved an overall IELTS score of no less than a 7.5 and no less than a 7 on the Reading, Speaking, Listening and Writing Tests
  - achieved an overall TOEFL Internet Based Test score of no less than 102 and no less than 27 on the writing and speaking sections and no less than 24 on the listening and reading sections
  - achieved a level of no less than 5 in the HL English Language A: Literature or English Language A: Language and Literature paper or no less than 6 in the SL English Language A: Literature or English Language A: Language and Literature paper in the International Baccalaureate Diploma
  - achieved an OLD Scholastic Aptitude Test (SAT) essay score of no less than 10 and no less than 700 on the Critical Reading and Writing Tests (before 2016) / achieved a NEW Scholastic Aptitude Test (SAT) score of no less than 37 on the Writing & Language Test and Reading Test (from 2016)
  - achieved a score of no less than 5 on the Advanced Placement English Language and Composition Test or the Literature and Composition Test
  - achieved an A\* in the English Language, English Literature or English Language and Literature GCE English A level paper (including specification A or B, if given)

Exempted students will not be able to enroll CAES1000 via Self Service enrollment.

- <sup>‡</sup> To satisfy the Chinese language enhancement requirement, Students are required to successfully complete the 6-credit Faculty-specific Chinese language enhancement course, except for:
  - (a) Putonghua-speaking students who should take CUND9002 (Practical Chinese and Hong Kong Society) or CUND9003 (Cantonese for Non-Cantonese Speaking Students). They may take the course in Year 1 or 2 if they so wish; and
  - (b) students who have not studied Chinese language during their secondary education or who have not attained the requisite level of competence in the Chinese language to take the Chinese language enhancement course should write to the Faculty Office to apply to be exempted from the Chinese language requirement, and
    - (i) take a 6-credit Cantonese or Putonghua language course offered by the School of Chinese especially for international and exchange students; OR
    - (ii) take an elective course (6 credits) in lieu.
- ^ Credit requirement for different majors or minors may vary.
- \* Students having a second major in Science are allowed to double-count the two Science Foundation Courses. The 12 credits can be made up by selecting any courses.

#### (b) Common Core Curriculum

The Common Core Curriculum is designed to provide key common learning experience for all HKU students and to broaden their horizons beyond their chosen disciplinary fields of study. It focuses on issues that have been, and continue to be, of deeply profound significance to mankind, the core intellectual skills that all HKU undergraduates should acquire and the core values that they should uphold. The Common Core Curriculum is divided into four Areas of Inquiry (AoIs): (1) Scientific and Technological Literacy; (2) Humanities; (3) Global Issues; (4) China: Culture, State and Society. Students have to pass 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits. Common Core courses should be completed normally within the first three years of the BSc study and cannot be extra taken as free electives.

### 2. BSc Graduation Requirements and Honours Classification (for students admitted under the 4-year '2012 curriculum' in 2012-13 or thereafter)

#### (a) Award of a BSc degree

To be eligible for the award of the degree of Bachelor of Science, students must fulfill the following requirements:

- (i) Satisfied the requirements in UG5 of the Regulations for First Degree Curricula\*;
- (ii) Passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the major programme of the BSc degree curriculum.

- # UG5 specifies that students have to successfully complete:
  - (a) 12 credits in English language enhancement, including 6 credits in Core University English<sup>1</sup> (i.e. CAES1000) and 6 credits in an English in the Discipline course<sup>2</sup> (i.e. CAES9820 Academic English for Science Students);
  - (b) 6 credits in Chinese language enhancement<sup>3</sup> (i.e. CSCl9001 Practical Chinese for Science Students);
  - (c) 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>4</sup> with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits; and
  - (d) a capstone experience as specified in the syllabuses of the degree curriculum.

#### (b) Honours Classification

#### For 2012, 2013, 2014, 2014 and 2016 cohort:

Classification of honours are calculated using the cumulative grade point average CGPA as below:

	CGPA range
First Class Honours	3.60 - 4.30
Second Class Honours Division I	3.00 - 3.59
Second Class Honours Division II	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 – 1.69

#### For 2017 cohort or thereafter:

Classification of honours are calculated using the graduation grade point average GGPA\* as below:

	CGPA range
First Class Honours	3.60 - 4.30
Second Class Honours Division I	3.00 - 3.59
Second Class Honours Division II	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 – 1.69

Credits granted for advanced standing in recognition of studies completed successfully elsewhere before admission to the University and credits transfer in recognition of studies completed on exchange during candidature at HKU are not included in the calculation of GPA.

\* For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core courses with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

- tested by CAES to be of a native English speaker standard

Exempted students will not be able to enroll CAES1000 via Self Service enrollment.

<sup>&</sup>lt;sup>1</sup> Candidates with the following qualifications shall be exempted from this requirement and should take a 6-credit elective course in lieu, see *Regulation UG6*:

 <sup>5\*\*</sup> on the HKDSE English Language Paper

<sup>-</sup> holder of Bachelor's degree from an English-medium university

achieved an overall IELTS score of no less than a 7.5 and no less than a 7 on the Reading, Speaking, Listening and Writing Tests

achieved an overall TOEFL Internet Based Test score of no less than 102 and no less than 27 on the writing and speaking sections and no less than 24 on the listening and reading sections

<sup>-</sup> achieved a level of no less than 5 in the HL English Language A: Literature or English Language A: Language and Literature paper or no less than 6 in the SL English Language A: Literature or English Language A: Language and Literature paper in the International Baccalaureate Diploma

achieved an OLD Scholastic Aptitude Test (SAT) essay score of no less than 10 and no less than 700 on the Critical Reading and Writing Tests (before 2016) / achieved a NEW Scholastic Aptitude Test (SAT) score of no less than 37 on the Writing & Language Test and Reading Test (from 2016)

achieved a score of no less than 5 on the Advanced Placement English Language and Composition Test or the Literature and Composition Test

<sup>-</sup> achieved an A\* in the English Language, English Literature or English Language and Literature GCE English A level paper (including specification A or B, if given)

- 2 (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.
  - (b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.
  - (c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.
- Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take a 6-credit elective course in lieu, see Regulation UG6.
- Candidates registered for double degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, with the curriculum of the first degree, as appropriate.

**Capstone Requirement for** 

**Science Students** 

#### SECTION II Capstone Requirement for Science Students

Capstone experience is an integral part of the major programme which focuses on integration and application of knowledge and skills gained in the early years of study. The capstone course carries a minimum of 6 credits and students must complete this for fulfillment of the graduation requirements. Capstone course is normally taken in the senior years (year 3 or 4) of study. The earliest that a student is allowed to take a capstone course is their year 3 study. The capstone courses in each Science major may be different but a range of courses (e.g. research project, seminar, field work, internship and capstone project) is offered to suit individual student's needs and interests. The following courses are currently recognized as capstone courses in the different majors:

BSc - N	Major	Recognized Ca	pstone Courses
1. Bio	ochemistry	1. BIOC3999 2. BIOC4966 3. BIOC4999	Directed studies in biochemistry (6) Biochemistry internship (6) Biochemistry project (12)
2. Bio	ological Sciences	<ol> <li>BIOL3994</li> <li>BIOL4964</li> <li>BIOL4994</li> </ol>	Directed studies in biological sciences (6) Biological sciences internship (6) Biological sciences project (12)
3. Ch	nemistry	<ol> <li>CHEM4910</li> <li>CHEM4911</li> <li>CHEM4966</li> </ol>	Directed studies in chemistry (6) Chemistry literacy and research (6) Capstone experience for chemistry undergraduates: HKUtopia (6) Chemistry internship (6) Chemistry project (12)
4. Ear	rth System Science	1. EASC4911	Earth system: contemporary issues (6)
5. Eco	cology & Biodiversity	1. BIOL3991 2. BIOL4911 3. BIOL4991	Directed studies in ecology & biodiversity (6) Conservation science in practice (6) Ecology & biodiversity project (12)
	vironmental Science	3. ENVS4966	Directed studies in environmental science (6) Environmental science in practice (6) Environmental science internship (6) Environmental science project (12)
7. Foo	ood & Nutritional Science	<ol> <li>BIOL3992</li> <li>BIOL4913</li> <li>BIOL4922</li> <li>BIOL4962</li> <li>BIOL4992</li> </ol>	Directed studies in food & nutritional science (6) Advanced practicum of food and nutrient analysis (6) (new) Food product development and evaluation (6) Food & nutritional science internship (6) Food & nutritional science project (12)
8. Ge	eology	1. EASC4955	Integrated field studies (6)
9. Ma	athematics	<ol> <li>MATH4910</li> <li>MATH4911</li> <li>MATH4966</li> </ol>	Directed studies in mathematics (6) Senior mathematics seminar (6) Mathematics capstone project (6) Mathematics internship (6) Mathematics project (12)
	athematics / Physics	<ol> <li>MATH4910</li> <li>MATH4911</li> <li>MATH4966</li> <li>MATH4999</li> <li>PHYS3999</li> <li>PHYS4966</li> <li>PHYS4999</li> </ol>	Directed studies in mathematics (6) Senior mathematics seminar (6) Mathematics capstone project (6) Mathematics internship (6) Mathematics project (12) Directed studies in physics (6) Physics internship (6) Physics project (12)
	olecular Biology & Biotechnology	1. BIOL3993 2. BIOL4963 3. BIOL4993	Directed studies in molecular biology & biotechnology (6) Molecular biology & biotechnology internship (6) Molecular biology & biotechnology project (12)
13. Ph			Directed studies in physics (6) Physics internship (6) Physics project (12)
	ecision Analytics sk Management atistics	1. STAT3799 2. STAT4710 3. STAT4766 4. STAT4799	Directed studies in statistics (6) Capstone experience for statistics undergraduates (6) Statistics internship (6) Statistics project (12)

**Credit Unit Statement of** 

**BSc Degree Curriculum** 

#### SECTION III Credit Unit Statement of the BSc Degree Curriculum (4-year)

#### 1. General guideline for contact hours requirement in the BSc Degree Curriculum

- (a) A 6-credit course has around 120-180 total study hours, including contact hours, study time, assignment and assessment.
- (b) About 30% of the total study hours are actual contact hours in the form of a class, e.g. lecture hours.
- (c) A 6-credit course has around 36 to 45 lecture hours.
- (d) For lecture-based courses, normally there will be tutorial/discussion sessions.
- (e) For courses employing a non-lecture or lab-based approach, e.g. field camp, IT-based or project-based courses, students are expected to devote about 120-180 hours for a 6-credit course and 240-360 hours for a 12-credit course.

#### 2. Credit Unit Statement of the BSc Degree Curriculum

The BSc degree curriculum consists of six major types of courses based on the learning activities. The majority of courses in the programmes are 6 credits. Examples of the contact hours requirements for the six categories of courses are described as follows.

#### (a) Lecture-based courses (6 credits)

Contact hours for 6-credit course: 36 hours of lectures and 12 hours of tutorial/discussion These courses are taught predominantly by lectures and tutorials. Assessment is by a combination of examination (0-80%) and continuous assessment (20-100%). Continuous assessment tasks include written assignments (totaling no more than 8,000 words) such as essays and project reports, and oral presentations. Details of the assessment tasks can be found in the description of individual courses.

#### (b) Lecture with laboratory component courses (6 credits)

Contact hours for 6-credit course: 24 hours of lectures, 24 hours of laboratory and 6 hours of tutorial

These courses are taught by a combination of lectures and laboratory/practical sessions. Assessment is by a combination of examination (0-70%) and continuous assessment (30-100%). Continuous assessment tasks include written assignments (totaling no more than 8,000 words) such as essays, laboratory reports, and project reports, and oral presentations. Details of the assessment tasks can be found in the description of individual courses.

#### (c) Laboratory and Workshop courses (6 credits)

Contact hours: 48 hours of laboratory or workshop and 12 hours of tutorial

These courses aim at enriching the student's research skills and encourage group work through hands-on activities in which science research is introduced. Students are expected to spend an additional 100 hours on self-study, preparation work for the laboratory, and writing reports. Continuous assessment tasks (100%) include written assignments (totaling no more than 8,000 words) such as laboratory report for each experiment (normally no more than 10 experiments) and essays. Details of the assessment tasks can be found in the description of individual courses.

#### (d) Project-based courses (6 and 12 credits)

These courses aim at providing students with an opportunity to pursue their own research interest under the supervision of a teacher. The teacher normally meets with the student weekly to discuss project progress. Assessment task is normally through research reports or a dissertation (totaling no more than 10,000 words for a 6-credit course and 20,000 words for a 12-credit course). Oral presentation will form part of the assessment. Details of the assessment tasks can be found in the description of individual courses.

#### (e) Field camps (6 credits)

Contact hours: at least 72 hours in the field

These courses aim at giving practical experience in a variety of contexts. Fieldwork may be conducted locally or overseas during reading week or summer. Fieldwork courses have a small number of lecture hours but are predominately practical in nature. Assessment tasks (100%) normally include the following outputs (totaling no more than 8,000 words): field assignments and reports (normally no more than 10 field assignments). Details of the assessment tasks can be found in the description of individual courses.

#### (f) Internship (6 credits)

Students have to undertake at least 160 hours of internship work

Internships aim to offer students the opportunity to gain work experience related to their major of study. The teacher meets with the student regularly to discuss work progress. Students have to undertake at least 160 hours of internship work arranged formally. Assessment tasks (100%) normally include the following outputs: a written report of no more than 2000 words and feedback from the internship supervisor and an oral presentation on students' internship experience. Details of the assessment tasks can be found in the description of individual courses.

#### 3. The types of courses in the 16 Science Majors and 17 Science Minors are as follows:

	Type of Courses											
Majors/Minors	Lecture- based	Lecture with laboratory component	Laboratory & Workshop	Project- based	Field camps	Internship						
Actuarial Studies (Minor)	✓	✓	✓	✓		✓						
Astronomy (Major & Minor)	✓	✓	✓	<b>✓</b>		✓						
Biochemistry (Major & Minor)	✓	✓	✓	<b>✓</b>		✓						
Biological Sciences (Major)	✓	✓	✓	<b>✓</b>		✓						
Chemistry (Major & Minor)	✓	✓	✓	<b>✓</b>		✓						
Computational & Financial Mathematics (Minor)	<b>✓</b>	✓	✓	<b>✓</b>		✓						
Decision Analytics (Major)	✓	✓	✓	✓		✓						
Earth Sciences (Minor)	✓	✓	✓	✓	✓	✓						
Earth System Science (Major)	✓	✓	✓	✓	✓	✓						
Ecology & Biodiversity (Major & Minor)	✓	✓	✓	<b>√</b>	<b>√</b>	✓						
Environmental Science (Major & Minor)	✓	✓	✓	<b>✓</b>	✓	✓						
Food & Nutritional Science (Major & Minor)	✓	✓	<b>✓</b>	✓		✓						
Geology (Major)	✓	✓	✓	✓	✓	✓						
Marine Biology (Minor)	✓	✓	✓	✓	✓	✓						
Mathematics (Major & Minor)	✓	✓	✓	<b>✓</b>		✓						
Mathematics / Physics (Major)	✓	✓	✓	<b>✓</b>		✓						
Molecular Biology & Biotechnology (Major & Minor)	<b>✓</b>	✓	✓	<b>✓</b>		✓						
Operations Research & Mathematical Programming (Minor)	<b>✓</b>	✓	✓	<b>✓</b>		✓						
Physics (Major & Minor)	✓	✓	✓	✓		✓						
Plant Science (Minor)	<b>✓</b>	✓	✓	✓		✓						
Risk Management (Major & Minor)	✓	✓	✓	✓		✓						
Statistics (Major & Minor)	✓	✓	✓	✓		✓						

The above different categories of courses follow the unified Credit Unit Statement of the BSc curriculum.

List of BSc Courses and English and

Chinese language courses on offer in 2017-18 and 2018-19

#### SECTION IV List of BSc Courses on offer in 2017/18 and 2018/19<sup>^</sup>

Course Code	Title	Credit	Pre-requisite	Availa	able in	Semester offered in 2017 - 2018	Exam. held in 2017 - 2018	Quota	Course Coordinator		Major / I (The Major/Minor that the		
				2017 - 2018	2018 - 2019	0=year long 1=1st sem 2=2nd sem S=Summer	1st sem 2nd sem			Disciplinary Core Course	Disciplinary Elective	Capstone - Disciplinary Core Course	Capstone - Disciplinary Elective
School of Bi	omedical Sciences		1							1			1
BIOC1600	Perspectives in biochemistry	6	Level 3 or above in HKDSE Biology, Chemistry, or Combined Science with Biology or Chemistry component, or equivalent	Y	Y	1	Dec		Dr J Tanner, Biomedical Sciences	Major in Biochemistry (2014,2013,2012)	Major in Biochemistry (2017,2016,2015); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012)		
BIOC2600	Basic biochemistry	6	Pass in BIOC1600 or BIOL1110 or ENGG1207; and Not for students who have passed in BIOL2220 or MEDE2301, or have already enrolled in these courses.	Y	Y	1	Dec	300	Prof D K Y Shum, Biomedical Sciences	Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Biological Sciences (2017,2016,2015); Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	Minor in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)		
BIOC3601	Basic metabolism	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	1	Dec	80	Dr N S Wong, Biomedical Sciences	Major in Biochemistry (2017,2016,2015,2014, 2013,2012)	Minor in Biochemistry (2017,2016,2015,2014, 2013,2012)		
BIOC3604	Essential techniques in biochemistry and molecular biology	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	2	May	70	Dr K M Yao, Biomedical Sciences	Major in Biochemistry (2017,2016,2015,2014, 2013,2012)	Minor in Biochemistry (2017,2016,2015,2014, 2013,2012)		
BIOC3605	Sequence bioinformatics	6	Pass in BIOC2600 or BIOL2220 or BBMS2003 or BBMS2007 or MEDE2301	Y	Y	2	May	50	Dr B C W Wong, Biomedical Sciences		Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012)		
BIOC3606	Molecular medicine	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	2	May	50	Prof D Y Jin, Biomedical Sciences		Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012)		
BIOC3999	Directed studies in biochemistry	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Biochemistry Major including BIOC2600 and BIOL3401.  This capstone course is for Biochemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam	36	Prof J D Huang, Biomedical Sciences				Major in Biochemistry (2017,2016,2015,2014 2013,2012)
BIOC4610	Advanced biochemistry	6	Pass in BIOC3601 or BIOL3401 or BIOL3402 or BIOL3404	Y	Y	1	Dec	50	Dr K M Yao, Biomedical Sciences	Major in Biochemistry (2017,2016,2015,2014, 2013,2012)	Minor in Biochemistry (2017,2016,2015,2014, 2013,2012)		
BIOC4611	Advanced biochemistry II	6	Pass in BIOC3601; and BIOL3404 or CHEM2441; and Pass in BIOC4610, or already enrolled in this course	N	N			50	Prof D Chan, Biomedical Sciences				
BIOC4612	Molecular biology of the gene	6	Pass in BIOC3601 or BIOL3401 or BIOL3402 or BIOL3404 or BBMS2007	Y	Y	2	May	50	Prof K S E Cheah, Biomedical Sciences		Major in Biochemistry (2017,2016,2015,2014,		

<sup>^</sup> Availability of courses in 2018-2019 is subject to change.

BIOC4613	Advanced techniques in biochemistry & molecular biology	6	Pass in BIOC3604	Y	Y	1	Dec	70	Prof D Chan, Biomedical Sciences	Major in Biochemistry (2017,2016,2015,2014,	2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012) Minor in Biochemistry (2017,2016,2015,2014,	
	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,									2013,2012)	2013,2012)	
BIOC4966	Biochemistry internship	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Biochemistry Major including BIOC3604. This capstone course is for Biochemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam	20	Prof J D Huang, Biomedical Sciences			Major in Biochemistry (2017,2016,2015,2014, 2013,2012)
BIOC4999	Biochemistry project	12	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Biochemistry Major including 4 of the following 5 courses: BIOL3401, BIOC3601, BIOC3604, BIOC4610 and BIOC4613. BIOC4610 and BIOC4613 can be taken concurrently with this course. This capstone course is for Biochemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam	25	Dr N S Wong, Biomedical Sciences			Major in Biochemistry (2017,2016,2015,2014, 2013,2012)
BIOL3404	Protein structure and function	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	2	May	70	Dr C M Qian, Biomedical Sciences		Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Biological Sciences (2017,2016); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012)	
School of Bi	ological Sciences					!				•	•	
BIOL1110	From molecules to cells	6	NIL Students who wish to take this course are expected to have taken HKDSE Biology and/or Chemistry or equivalent. For students without HKDSE Chemistry, they are encouraged to take CHEM1041 concurrently or before.	Y	Y	1, 2	Dec, May	420	Prof B K C Chow, Biological Sciences	Major in Biochemistry (2014,2013,2012); Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	Major in Biochemistry (2017,2016,2015); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012)	
BIOL1111	Introductory microbiology	6	NIL	N	N			80	, Biological Sciences	Major in Biological Sciences (2014,2013,2012)		
BIOL1201	Introduction to food and nutrition	6	NIL	Y	Y	1	Dec	190	Dr J W F Wan, Biological Sciences	Major in Food & Nutritional Science	Minor in Food & Nutritional Science	

										(2017,2016,2015,2014, 2013,2012)	(2017,2016,2015,2014, 2013,2012)	
BIOL1309	Evolutionary diversity	6	NIL	Y	Y	2	May	250	Prof R M K Saunders, Biological Sciences	Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Earth System Science (2016,2015,2014,2013, 2012); Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Major in Food & Nutritional Science (2016,2015,2014); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	Major in Food & Nutritional Science (2013); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012)	
BIOL1501	Bioethics	6	NIL	N	N			40	, Biological Sciences			
BIOL1502	The gene	6	NIL Not for students with level 3 or above in HKDSE Biology or Combined Science with Biology component or equivalent.	N	N			50	, Biological Sciences			
BIOL2101	Principles of food chemistry	6	Pass in BIOL1201; and NOT for students who have passed in BIOL3201. The course is only for students admitted in 2017-2018 or thereafter.	Y	Y	1	Dec	30	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2017)	Minor in Food & Nutritional Science (2017)	
BIOL2102	Biostatistics	6	Pass in BIOC1600 or BIOL1110 or BIOL2306 or ENVS1301 or ENVS2002	Y	Y	2	May	190	Prof K M Y Leung, Biological Sciences	Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	
BIOL2103	Biological sciences laboratory course	6	Pass in BIOL1110	Y	Y	1, 2	Dec, May	220	Dr W Y Lui, Biological Sciences	Major in Biological Sciences (2017, 2016, 2015, 2014, 2013, 2012); Major in Ecology & Biodiversity (2017, 2016, 2015, 2014, 2013, 2012); Major in Food & Nutritional Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Molecular Biology & Biotechnology (2017, 2016, 2015, 2014, 2013, 2012); Major in	Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012)	
BIOL2220	Principles of biochemistry	6	Pass in BIOL1110; and Not for students who have passed in BIOC2600, or have already enrolled in this course.	Y	Y	1	Dec	100	Dr C S C Lo, Biological Sciences	Major in Biochemistry (2017,2016,2015); Major in Biological Sciences (2017,2016,2015); Major in Food & Nutritional Science	Minor in Biochemistry (2017,2016,2015); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology &	

BIOL2306	Ecology and evolution	6	Pass in BIOL1110 or BIOL1309 or ENVS1301 or ENVS1401	Y	Y	1	Dec	89	Prof D Dudgeon, Biological Sciences	Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012) Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Ecology & Biodiversity (2017,2016,2015,2014,	Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012) Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Major in Food & Nutritional Science (2013); Major in Molecular Biology &	
										Food & Nutritional Science (2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	
BIOL3101	Animal behaviour	6	Pass in BIOL2306; and Pass in one of the following courses: BIOL3301, BIOL3313, BIOL3319, BIOL3320 or BIOL3419 Not for students who have passed in BIOL4303	N	Y			30	Dr L Karczmarski, Biological Sciences		Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	
BIOL3105	Animal physiology and environmental adaptation	6	Pass in BIOL2103 or BIOL2220 or BIOC2600	Y	Y	2	May	50	Prof A O L Wong, Biological Sciences		Major in Biological Sciences (2017,2016,2015,2014, 2013,2012)	
BIOL3107	Plant physiology	6	Pass in BIOL2103	Y	Y	1	Dec	30	Dr W K Yip, Biological Sciences		Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012)	
BIOL3108	Microbial physiology	6	Pass in BIOC2600 or BIOL2103 or BIOC3604	N	N			50	Dr A Yan, Biological Sciences		Major in Biological Sciences (2015,2014,2013,2012)	
BIOL3109	Environmental microbiology	6	Pass in BIOL2103	Y	Y	2	May	40	Dr J D Gu, Biological Sciences		Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012)	
BIOL3110	Environmental toxicology	6	Pass in BIOL2103 or CHEM3141 or ENVS3042	Y	Y	2	May	60	Dr J D Gu, Biological Sciences		Major in Biological Sciences (2015,2014,2013,2012); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
BIOL3201	Food chemistry	6	Pass in BIOC2600 or BIOL2103 or BIOL2220; and NOT for students who have passed in BIOL2101.	Y	Y	1	Dec	50	Dr J C Y Lee, Biological Sciences	Nutritional Science	Minor in Food & Nutritional Science (2016,2015,2014,2013,	

			This course is only for students admitted in 2016-2017 or before.							2012)	2012)	
BIOL3202	Nutritional biochemistry	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	1	Dec	100	Dr C B Chan, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3203	Food microbiology	6	Pass in BIOC2600 or BIOL2220	Y	Y	2	May	80	Dr H S El-Nezami, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	Major in Biological Sciences (2017,2016); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3204	Nutrition and the life cycle	6	Pass in BIOC2600 or BIOL2220 or BIOL3202	Y	Y	2	May	70	Dr J C Y Louie, Biological Sciences		Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3205	Human physiology	6	Pass in BIOC2600 or BIOL2103 or BIOL2220	Y	Y	1	Dec	120	Dr W Y Lui, Biological Sciences		Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3206	Clinical nutrition	6	Pass in BIOL3202 or BIOL3203 or BIOL3204 or BIOL3205	Y	Y	2	May	70	Dr J M F Wan, Biological Sciences		Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3207	Food and nutritional toxicology	6	Pass in BIOC2600 or BIOL2220 or BIOL3205	Y	Y	2	May	80	Dr H S El-Nezami, Biological Sciences		Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3208	Food safety and quality management	6	Pass in BIOL3201 or BIOL3203	N	N				Dr O Habimana, Biological Sciences		Major in Food & Nutritional Science (2016,2015,2014,2013, 2012); Minor in Food & Nutritional Science (2016,2015,2014,2013, 2012)	
BIOL3209	Food and nutrient analysis	6	Pass in BIOL2101 or BIOL3201	Y	Y	1	Dec	70	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2017)	Major in Food & Nutritional Science (2016,2015,2014,2013,	

											2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3210	Grain production and utilization	6	Pass in any level 2 BIOL course	N	N			40	Prof H Corke, Biological Sciences		Major in Food & Nutritional Science (2016,2015,2014,2013, 2012); Minor in Food & Nutritional Science (2016,2015,2014,2013, 2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012)	
BIOL3211	Nutrigenomics	6	Pass in BIOC2600 or BIOL2220	Y	Y	1	Dec	40	Dr K C Tan-Un, Biological Sciences		Major in Food & Nutritional Science (2017, 2016, 2015, 2014, 2013, 2012); Minor in Food & Nutritional Science (2017, 2016, 2015, 2014, 2013, 2012)	
BIOL3215	Principles of dietary assessment	6	Pass in BIOL2102	Y	Y	1	No exam	30	Dr J C Y Louie, Biological Sciences		Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3216	Food waste management	6	Pass in BIOL2101 or BIOL3201	Y	Y	2	May	30	Dr O Habimana, Biological Sciences		Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3217	Food, environment and health	6	Pass in BIOL 2101 or BIOL3201	Y	Y	1	Dec	50	Dr T. Sobko, Biological Sciences		Major in Food & Nutritional Science (2017, 2016, 2015, 2014, 2013, 2012); Minor in Food & Nutritional Science (2017, 2016, 2015, 2014, 2013, 2012)	
BIOL3218	Food hygiene and quality control	6	Pass in BIOL2101 or BIOL3201 or BIOL3203 Not for student who have passed in BIOL3208	Y	Y	1	Dec	30	Dr O Habimana, Biological Sciences		Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL3301	Marine biology	6	Pass in BIOL2306 or ENVS2002	Y	Y	1	Dec	40	Dr M Yasuhara, Biological Sciences	Major in Ecology & Biodiversity (2017); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012)	Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	
BIOL3302	Systematics and phylogenetics	6	Pass in BIOL1309; and Any level 2 BIOL course	Y	Y	1	Dec	60	Prof R M K Saunders, Biological Sciences	Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Minor in	

											Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	
BIOL3303	Conservation biology	6	Pass in BIOL2306	Y	Y	2	May	60	Dr T C Bonebrake, Biological Sciences	Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012)	Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Ecology & Biodiversity (2017); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012)	
BIOL3305	Tropical and temperate marine ecology field course	6	Pass in BIOL2306 or BIOL3301	Y	Y	S	No exam	15	Dr B Russell, Biological Sciences		Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012)	
BIOL3313	Freshwater ecology	6	Pass in BIOL2102 and BIOL2306	N	Y			30	Prof D Dudgeon, Biological Sciences		Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	
BIOL3314	Plant structure and evolution	6	Pass in BIOL1309; and Any level 2 BIOL course	Y	Y	2	May	30	Prof R M K Saunders, Biological Sciences		Major in Biological Sciences (2017,2016); Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012)	
BIOL3318	Experimental intertidal ecology	6	Pass in BIOL2102 or BIOL3301	N	Y			20	Prof G A Williams, Biological Sciences		Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012)	
BIOL3319	Tropical terrestrial ecology	6	Pass in BIOL1309 and BIOL2306	Y	Y	2	May	30	Dr B Guenard, Biological Sciences	Major in Ecology & Biodiversity (2017)	Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	
BIOL3320	The biology of marine mammals	6	Pass in BIOL2306	Y	N	1	Dec	30	Dr L Karczmarski,		Major in Ecology &	

									Biological Sciences		Biodiversity (2016,2015,2014,2013, 2012); Minor in Ecology & Biodiversity (2016,2015,2014,2013, 2012); Minor in Marine Biology (2016,2015,2014,2013, 2012)	
BIOL3322	Marine invertebrate zoology	6	Pass in BIOL2306	Y	N	2	May	30	Dr S Cannicci, Biological Sciences		Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012)	
BIOL3328	Nearshore marine and estuarine ecology	6	Pass in BIOL2306 or BIOL3301	Y	Y	2	No exam	10	Prof. G.A. Williams, Biological Sciences		Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012)	
BIOL3401	Molecular biology	6	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301	Y	Y	1	Dec	130	Prof. B K C Chow, Biological Sciences	Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012)	
BIOL3402	Cell biology and cell technology	6	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301	Y	Y	1	Dec	120	Prof A S T Wong, Biological Sciences	Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	
BIOL3403	Immunology	6	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301	Y	Y	2	May		Prof W W M Lee, Biological Sciences		Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology & 2017,2016,2015,2014, 2013,2012)	
BIOL3405	Molecular microbiology	6	Pass in BIOL2103	N	N			30	, Biological Sciences		Major in Molecular	

											Biology & Biotechnology (2015,2014,2013,2012)	
BIOL3406	Reproduction and reproductive biotechnology	6	Pass in BIOL2103 or BIOL2220or BIOC2600	Y	Y	1	Dec	40	Prof A O L Wong, Biological Sciences		Major in Biological Sciences (2017,2016); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	
BIOL3408	Genetics	6	Pass in BIOL2103	Y	Y	1	Dec	50	Dr C S C Lo, Biological Sciences		Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012)	
BIOL3409	Business aspects of biotechnology	6	Pass in any level 3 BIOL or BIOC or BBMS course	Y	Y	2	No exam	40	Dr W B L Lim, Biological Sciences		Major in Biological Sciences (2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	
BIOL3419	Insect ecology: the little things that run the world	6	Pass in BIOL1309 and BIOL2306	N	Y			25	Dr B Guenard, Biological Sciences		Major in Biological Sciences (2017,2016); Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	
BIOL3501	Evolution	6	Pass in BIOL2306	N	N			50	Dr M Sun, Biological Sciences		Major in Biological Sciences (2017,2016)	
BIOL3502	Conservation genetics	6	Pass in BIOL2306 or BIOL3303 or BIOL3408	N	N			50	Dr M Sun, Biological Sciences			
BIOL3503	Endocrinology: human physiology II	6	Pass in BIOL2103	Y	Y	2	May	60	Dr C B Chan, Biological Sciences		Major in Biological Sciences (2017,2016)	
BIOL3505	Oyster aquaculture and restoration	6	Pass in BIOL2103 or BIOL2306 or BIOL3301 or BIOL3303	N	N			20	Dr T Vengatesen, Biological Sciences		Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012)	
BIOL3508	Microbial physiology and biotechnology	6	Pass in BIOL2103 or BIOL2220 or BIOC2600 or BIOC3604; Not for students who have passed in BIOL3108; and Not for students who have passed in BIOL4402.	Y	Y	1	Dec	60	Dr A Yan, Biological Sciences	Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	Major in Biological Sciences (2017, 2016, 2015, 2014, 2013, 2012); Minor in Molecular Biology & Biotechnology (2017, 2016, 2015, 2014, 2013, 2012)	
BIOL3951	Ecology & biodiversity field course	6	Pass in at least 24 credits of advanced	N	N			20	Dr L Karczmarski,			Major in Ecology &

			level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Ecology & Biodiversity Major. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.						Biological Sciences		Biodiversity (2015,2014,2013,2012)
BIOL3991	Directed studies in ecology & biodiversity	6	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology & Biodiversity Major. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	N	0	No exam		Prof G A Williams, Biological Sciences		Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)
BIOL3992	Directed studies in food & nutritional science	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Food & Nutritional Science Major. This capstone course is for Food & Nutritional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Dr O Habimana, Biological Sciences		Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)
BIOL3993	Directed studies in Molecular biology & biotechnology	6	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Molecular Biology & Biotechnology Major. This capstone course is for Molecular Biology & Biotechnology Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Dr W K Yip, Biological Sciences		Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)
BIOL3994	Directed studies in biological sciences	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Biological Sciences Major. This capstone course is for Biological Sciences Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Prof W W M Lee, Biological Sciences		Major in Biological Sciences (2017,2016,2015,2014, 2013,2012)
BIOL4201	Public health nutrition	6	Pass in BIOL3201 or BIOL3202	Y	Y	2	May	90	Dr J M F Wan, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL4202	Nutrition and sports performance	6	Pass in BIOL3202	Y	Y	2	May	30	Dr T Sobko, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)	
BIOL4204	Diet, brain function and behavior	6	Pass in BIOL3204, or already enrolled in this course	N	N			30	Dr E T S Li, Biological Sciences	Major in Food & Nutritional Science	

										(2016,2015,2014,2013, 2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)
BIOL4205	Food processing and engineering	6	Pass in BIOL3201	Y	Y	2	May	15	Prof. N P Shah, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)
BIOL4207	Meat and dairy sciences	6	Pass in BIOL3201	N	N			50	Prof N P Shah, Biological Sciences	Major in Food & Nutritional Science (2016,2015,2014,2013, 2012); Minor in Food & Nutritional Science (2016,2015,2014,2013, 2012)
BIOL4208	Meat, dairy and grain sciences	6	Pass in BIOL 3201 or (BIOL2101 and any level 3 BIOL course); and Not for students who have passed in BIOL3210; and Not for students who have passed in BIOL4207	Y	Y	2	May	15	Prof N P Shah, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)
BIOL4209	Functional foods	6	Pass in BIOL3201 or BIOL3202	Y	Y	1	Dec	40	Dr M F Wang, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012); Minor in
BIOL4210	Food product development	6	Pass in BIOL3203 or BIOL4205	N	N			40	Dr M F Wang, Biological Sciences	Major in Food & Nutritional Science (2015,2014,2013,2012) ; Minor in Food & Nutritional Science (2016,2015,2014,2013, 2012)
BIOL4301	Fish and fisheries	6	Pass in BIOL3301 or BIOL3303	Y	N	2	May	40	Prof Y J Sadovy, Biological Sciences	Major in Biological Sciences (2015,2014,2013,2012); Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012)
BIOL4302	Environmental impact assessment	6	Pass in (BIOL2103 or BIOL2306); and (ENVS3004 or any BIOL3XXX course)	Y	Y	2	May	30	Dr B D Russell, Biological Sciences	Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Major in Environmental Science (2017,2016,2015,2014,

											2013,2012); Minor in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
BIOL4303	Animal behaviour	6	Pass in BIOL2306; and Pass in one of the following courses: BIOL3301, BIOL3313, BIOL3319, BIOL3320 or BIOL3419 Not for students who have passed in BIOL3101	N	N			30	Dr L Karczmarski, Biological Sciences		Major in Ecology & Biodiversity (2015,2014,2013,2012) ; Minor in Ecology & Biodiversity (2015,2014,2013,2012)	
BIOL4304	Ecosystem functioning and services	6	Pass in one of the following courses: BIOL3301 or BIOL3303 or BIOL3313 or BIOL3319 or ENVS3019 or ENVS3004 or ENVS3020	Y	N	1	Dec	30	Dr B D Russell, Biological Sciences		Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	
BIOL4401	Medical microbiology and applied immunology	6	Pass in BIOL3401 or BIOL3403	Y	Y	2	May	40	Dr W Y Lui, Biological Sciences		Major in Biological Sciences (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	
BIOL4402	Microbial biotechnology	6	Pass in BIOL3401	N	N			30	, Biological Sciences	Major in Molecular Biology & Biotechnology (2015,2014,2013,2012)	Minor in Molecular Biology & Biotechnology (2015,2014,2013,2012)	
BIOL4409	General virology	6	Pass in BIOL3401 or BIOL3403	N	Y			30	Dr W B L Lim, Biological Sciences		Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	
BIOL4411	Plant and food biotechnology	6	Pass in BIOL3211 or BIOL3401	Y	Y	1	Dec	80	Dr J S H Tsang, Biological Sciences	Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	Major in Biological Sciences (2017,2016); Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Plant Science (2017,2016,2015,2014, 2013,2012)	
BIOL4415	Healthcare biotechnology	6	Pass in BIOL3401	Y	Y	2	May	70	Prof A S T Wong, Biological Sciences	Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	Minor in Molecular Biology & Biotechnology (2017, 2016, 2015, 2014, 2013, 2012)	
BIOL4416	Stem cells and regenerative biology	6	Pass in BIOC3601 or BIOC3604 or BIOL3211 or BIOL3401 or BIOL3402 or BIOL3403 or BIOL3404 or BIOL3408	N	Y			40	Dr K W Y Yuen, Biological Sciences		Major in Molecular Biology & Biotechnology (2017,2016,2015,2014,	

BIOL4417	'Omics' and systems biology	6	Pass in BIOC3601 or BIOC3604 or BIOL3211 or BIOL3401 or BIOL3402 or	Y	N	2	May	40	Dr J W Zhang, Biological Sciences	2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012) Major in Biochemistry (2017,2016,2015,2014,	
			BIOL3403 or BIOL3404 or BIOL3408							2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience	6	Pass in at least one of the following courses: BIOL3101, BIOL3301, BIOL3313 or BIOL3320. This experiential field course is primarily for Ecology & Biodiversity Major students. The earliest that a student is allowed to take this experiential course is their year 3 study; and because it is conducted in early June, this course is best suited for year 3 students.	N	N			12	Dr L Karczmarski, Biological Sciences	Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012)	
BIOL4501	Molecular phylogenetics and evolution	6	Pass in BIOL3401 or BIOL3408	N	N			25	TBC, Biological Sciences		
BIOL4505	Oyster aquaculture: business and technology	6	Pass in BIOL3109 or BIOL3203 or BIOL3301 or BIOL3303 or ENVS3004 or ENVS3013; and Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Ecology and Biodiversity Major or Environmental Science Major or Biological Science Major. Not for students who have passed in BIOL3505	N	Y			20	Dr V Thiyagarajan, Biological Sciences	Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	
BIOL4861	Ecology & biodiversity internship	6	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology and Biodiversity Major. This course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this course is their Year 3.	Y	Y	1, 2, S	No exam		Dr T Vengatesen, Biological Sciences	Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)	
BIOL4911	Conservation science in practice	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Ecology & Biodiversity Major including BIOL3303. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	N	2	No exam	9	Prof Y J Sadovy, Biological Sciences		Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)
BIOL4912	Sensory evaluation of food	6	Pass in BIOL3201; and Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Food & Nutrional Science Major.	N	N			15	Dr J C Y Lee, Biological Sciences		Major in Food & Nutritional Science (2016,2015,2014,2013, 2012)

			This capstone course is for Food & Nutrional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.							
BIOL4913	Advanced practicum on food and nutrient analysis	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) included BIOL3207 and / or BIOL3209 in the Food & Nutrional Science Major. This capstone course is for Food & Nutrional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	2, S	No exam	20	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)
BIOL4921	Animal behaviour and behavioural ecology: field course	6	Pass in BIOL3101; and Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Ecology & Biodiversity Major. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	N	N			15	Dr L Karczmarski, Biological Sciences	Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012)
BIOL4922	Food product development and evaluation	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) included BIOL3203 and / or BIOL4205 in the Food & Nutritional Science Major. This capstone course is for Food & Nutritional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study. Not for students who have passed in BIOL4210 Food product development.	Y	Y	1	Dec	20	Dr M F Wang, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)
BIOL4962	Food & nutritional science internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Food & Nutritional Science Major.  This capstone course is for Food & Nutritional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)
BIOL4963	Molecular biology & biotechnology internship	6	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Molecular Biology & Biotechnology Major. This capstone course is for Molecular Biology & Biotechnology Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr W K Yip, Biological Sciences	Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)
BIOL4964	Biological sciences internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Biological Sciences Major.	Y	Y	1, 2, S	No exam		Prof W W M Lee, Biological Sciences	Major in Biological Sciences (2017,2016,2015,2014, 2013,2012)

			This captsone course is for Biological Sciences Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.									
BIOL4991	Ecology & biodiversity project	12	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology & Biodiversity Major; and Cumulative GPA of 3.0 or above. Students are not permitted to take both BIOL3991 and BIOL4991. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	<b>\</b>	0	No exam		Prof G A Williams, Biological Sciences			Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012)
BIOL4992	Food & nutritional science project	12	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Food & Nutritional Science Major; and Cumulative GPA of 3.0 or above. This capstone course is for Food & Nutritional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam		Dr J C Y Louie, Biological Sciences			Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012)
BIOL4993	Molecular biology & biotechnology project	12	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Molecular Biology & Biotechnology Major; and Cumulative GPA of 3.0 or above. This capstone course is for Molecular Biology & Biotechnology Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam		Dr W K Yip, Biological Sciences			Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012)
BIOL4994	Biological sciences project	12	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Biological Sciences Major; and Cumulative GPA of 3.0 or above. This capstone course is for Biological Sciences Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam		Prof W W M Lee, Biological Sciences			Major in Biological Sciences (2017,2016,2015,2014, 2013,2012)
ENVS1301	Environmental life science	6	NIL	Y	Y	2	May	60	Dr T Vengatesen, Biological Sciences		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Marine Biology (2017,2016,2015,2014, 2013,2012)	
ENVS2001	Methods in environmental science	6	Pass in BIOL1309 or EASC1401 or ENVS1301 or ENVS1401	Y	Y	1	No exam	42	Dr D M Baker, Biological Sciences	Major in Environmental Science (2017,2016,2015,2014, 2013)	Major in Environmental Science (2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	

ENVS2002	Environmental data analysis	6	Pass in BIOL1309 or EASC1401 or ENVS1301 or ENVS1401	Y	Y	2	May	65	Dr T C Bonebrake, Biological Sciences	Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013); Major in Environmental Science (2017,2016,2015,2014, 2013)	Major in Environmental Science (2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)		
ENVS3019	Urban ecology	6	Pass in BIOL2306 or ENVS2001 or ENVS2002	Y	N	1	Dec	75	Dr T C Bonebrake, Biological Sciences		Major in Ecology & Biodiversity (2017, 2016, 2015, 2014, 2013, 2012); Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Minor in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012)		
ENV\$3020	Global change ecology	6	Pass in BIOL2306 or ENVS2001 or ENVS2002	Z	Y		-	65	Dr C Dingle, Biological Sciences		Major in Ecology & Biodiversity (2017, 2016, 2015, 2014, 2013, 2012); Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Minor in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012)		
ENVS4110	Environmental remediation	6	Pass in BIOL3109 or BIOL3110 or BIOL3401 or ENVS3042	Y	N	2	May	30	Dr J D Gu, Biological Sciences		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2017,2016,2015,2014, 2017,2016,2015,2014, 2017,2016,2015,2014, 2013,2012)		
Centre for Ap	pplied English Studies												
CAES1000	Core University English	6	NIL	Υ	Y	1, 2	Dec, May		Dr N Fong, English				
CAES9820	Academic English for science students	6	NIL	Y	Y	1, 2	No exam		Ms E Law, English				
Department of	of Chemistry											<u> </u>	
CHEM1041	Foundations of chemistry	6	Level 3 or above in HKDSE Combined Science with Chemistry component or Integrated Science, or equivalent. Students without such background but keen on taking this foundation chemistry course may approach the course coordinator for consideration. Not for students with Level 3 or above in HKDSE Chemistry or having taken any level 1 Chemistry course or above or any equivalent Chemistry course.	Y	Y	1	Dec	156	Dr A P L Tong, Chemistry				
CHEM1042	General chemistry I	6	Level 3 or above in HKDSE Chemistry or equivalent or a pass in CHEM1041. Not for students having taken any level 1 Chemistry course (except for CHEM1041) or above or any equivalent Chemistry course.	Y	Y	1, 2	Dec, May	344	Dr A P L Tong, Chemistry	Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in	Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014,		

										Chemistry (2017,2016,2015,2014, 2013,2012)	2013,2012)	
CHEM1043	General chemistry II	6	Pass in CHEM1042; and Not for students in 2014-15 cohort or before having taken CHEM2541.	Y	Y	1, 2	Dec, May	290	Dr A P L Tong, Chemistry	Major in Biochemistry (2017,2016,2015); Major in Chemistry (2017,2016,2015); Minor in Chemistry (2017,2016,2015)	Major in Biochemistry (2014,2013,2012)	
CHEM1044	Mathematics in chemistry	6	Pass in CHEM1042 or already enrolled in this course; and Level 2 or above in Module 1 or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011	Y	Y	2	May	80	Prof C M Che, Chemistry			
CHEM2041	Principles of chemistry	6	Pass in CHEM1042; and Not for students who have passed in CHEM2341, or have already enrolled in this course; and Not for students who have passed in CHEM2441, or have already enrolled in this course; and Not for students who have passed in CHEM2541, or have already enrolled in this course; and Not for Chemistry major students.	N	N			140	Dr I K Chu, Chemistry		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2016,2015,2014,2013, 2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
CHEM2241	Analytical chemistry I	6	Pass in CHEM1042 (for students admitted in 2014-15 or before); Pass in CHEM1042; and Pass in CHEM1043, or already enrolled in this course (for students admitted in 2015-16 or thereafter)	Y	Y	1, 2	Dec, May	120	Dr W T Chan (1st sem); Dr I K Chu (2nd sem), Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012)	Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Minor in Chemistry (2017, 2016, 2015, 2014, 2013, 2012); Minor in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012)	
CHEM2341	Inorganic chemistry I	6	Pass in CHEM1042; and NOT for students who have passed in CHEM2041, or already enrolled in this course (for students admitted in 2014-15 or before); Pass in CHEM1042; and Pass in CHEM1043, or already enrolled in this course; and NOT for students who have passed in CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or thereafter)	Y	Y	1, 2	Dec, May	120	Prof V W W Yam (1st sem); Dr H Y Au Yeung (2nd sem), Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012)	Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM2441	Organic chemistry I	6	Pass in CHEM1042; and NOT for students who have passed in CHEM2041, or already enrolled in this course (for students admitted in 2014-15 or before); Pass in CHEM1042; and Pass in CHEM1043, or already enrolled in this course; and NOT for students who have passed CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or thereafter)	Y	Y	1, 2	Dec, May	200	Dr X Y Li (1st sem); Prof P Chiu (2nd sem), Chemistry	Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Chemistry (2017,2016,2015,2014, 2013,2012)	Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM2442	Fundamentals of organic chemistry	6	Pass in CHEM1042; and Not for students who have passed CHEM2441, or have already enrolled in this course.	Y	Y	1	Dec	130	Dr P H Toy, Chemistry		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in	

											Environmental Science (2017,2016,2015,2014, 2013,2012)	
CHEM2443	Fundamentals of organic chemistry for pharmacy students	6	Pass in CHEM1042; and Not for students who have passed CHEM2442, or already enrolled in this course. (This course is for BPharm students only)	Y	Y	1	Dec	60	Dr P H Toy, Chemistry			
CHEM2541	Introductory physical chemistry	6	Pass in CHEM1042; and NOT for students who have passed CHEM2041, or already enrolled in this course (for students admitted in 2014-15 or before); Pass in CHEM1042 and CHEM1043; and NOT for students who have passed CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or thereafter)	Y	Y	1, 2	Dec, May	200	Dr A M Y Yuen (1st sem); Dr J Y Tang (2nd sem), Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012)	Major in Biochemistry (2014,2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3141	Environmental chemistry	6	Pass in CHEM2041 or CHEM2341 or CHEM2441 or CHEM2442 or CHEM2541	Y	Y	2	May	100	Dr W T Chan, Chemistry		Major in Chemistry (2014,2013,2012); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
CHEM3142	Chemical process industries and analysis	6	Pass in CHEM2041 or CHEM2341 or CHEM2441 or CHEM2541	Y	Y	2	May	60	Prof G K Y Chan, Chemistry		Major in Chemistry (2014,2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3143	Introduction to materials chemistry	6	Pass in CHEM2441; and Pass in CHEM2541 or CHEM2341	Y	Y	1	Dec	100	Prof W K Chan, Chemistry		Major in Chemistry (2014,2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3146	Principles and applications of spectroscopic and analytical techniques	6	Pass in any CHEM2XXX level course	N	N			200	Dr X Li, Chemistry	Major in Chemistry (2014,2013,2012)	Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3241	Analytical chemistry II: chemical instrumentation	6	Pass in CHEM2241	Y	Y	1	Dec	80	Dr W T Chan, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012)	Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Minor in Chemistry (2017, 2016, 2015, 2014, 2013, 2012); Minor in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012)	
CHEM3242	Food and water analysis	6	Pass in CHEM2041 or CHEM2241 or CHEM2341 or CHEM2441 or CHEM2541.	Y	Y	2	May	50	Dr K M Ng, Chemistry		Major in Chemistry (2014,2013,2012); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014,	

											2013,2012)	
CHEM3243	Introductory instrumental chemical analysis	6	Pass in CHEM2041 or CHEM2241; and Not for students who have passed CHEM3241, or have already enrolled in this course.	Y	Y	2	May	65	Dr X Li, Chemistry		Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3244	Analytical techniques for pharmacy students	6	Pass in BPHM2136 (This course is for BPharm students only)	Y	Y	2	May	35	Dr X Li, Chemistry		Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3341	Inorganic chemistry II	6	Pass in CHEM2341	Y	Y	1	Dec	90	Prof V W W Yam, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012)	Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3342	Bioinorganic chemistry	6	Pass in CHEM2341	Y	Y	2	May	50	Prof H Z Sun, Chemistry		Major in Chemistry (2014,2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3441	Organic chemistry II	6	Pass in CHEM2441 [Remarks: CHEM3441 has been changed to lecture-based course from semester 2, 2015-16. For Chemistry students who admitted in 2014-15 or before, they must enroll also CHEM3443 for enrolling CHEM3441 (new version without lab component) to meet the Chemistry Major requirements.]	Y	Y	1, 2	Dec, May	300	Dr X Y Li (1st sem); Prof D Yang (2nd sem), Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012)	Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3442	Organic chemistry of biomolecules	6	Pass in CHEM2442 or CHEM2443 or CHEM3441	Y	Y	1	Dec	50	Dr P H Toy, Chemistry		Major in Chemistry (2014,2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3443	Organic chemistry laboratory	6	Pass in CHEM2441; and pass in CHEM3441, or already enrolled in this course; NOT for students who have passed CHEM3441 in semester 1, 2015-16, or CHEM3441 in or before 2014-2015 (for students admitted in 2014-15 or before) Pass in CHEM2441 or CHEM2442 or CHEM2443; and Pass in CHEM3441 or CHEM3442, or already enrolled in any of these two courses (for students admitted in 2015-16 or thereafter)	Y	Y	1, 2	Dec, May	80	Dr A M Y Yuen, Chemistry	Major in Chemistry (2017,2016,2015)	Major in Chemistry (2014,2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3445	Integrated laboratory	6	Pass in CHEM3443 or already enrolled in this course	Y	Y	S	No exam	20	Dr A M Y Yuen, Chemistry		Major in Chemistry (2014,2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry	6	Pass in CHEM2541	Y	Y	1	Dec	100	Prof G H Chen, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012)	Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics theory	6	Pass in CHEM2541	Y	Y	2	May	50	Dr. J Yang, Chemistry		Major in Chemistry (2014,2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
СНЕМ3999	Directed studies in chemistry	6	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major including a pass in CHEM2341 or CHEM2441 or CHEM2442 or CHEM2541 or	Y	Y	1, 2	No exam		Prof D L Phillips, Chemistry		Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	Major in Chemistry (2017,2016,2015,2014, 2013,2012)

			CHEM3146. This capstone course is for Chemistry Major students only. This course is designed for third year students who would like to take an early experience on research. The earliest that a student is allowed to take this capstone course is their year 3 study.							
CHEM4142	Symmetry, group theory and applications	6	Pass in CHEM3341	Y	Y	1	Dec	60	Prof V W W Yam, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4143	Interfacial science and technology	6	Pass in CHEM3541	N	Y			50	Prof G K Y Chan, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4144	Advanced materials	6	Pass in CHEM3143	Y	Y	2	May	50	Prof W K Chan, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4145	Medicinal chemistry	6	Pass in CHEM3441 or CHEM3442	Y	Y	2	May	70	Prof H Z Sun, Chemistry	Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4147	Supramolecular chemistry	6	Pass in CHEM3341 and CHEM3441	Y	Y	2	May	40	Dr H Y Au-Yeung, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4241	Modern chemical instrumentation and applications	6	Pass in CHEM3241	Y	Y	1	Dec	50	Dr I K Chu, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4242	Analytical chemistry	6	Pass in CHEM3241 or CHEM3242	Y	Y	2	May	50	Dr K M Ng, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4341	Advanced inorganic chemistry	6	Pass in CHEM3341	Y	Y	1	Dec	80	Prof C M Che, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4342	Organometallic chemistry	6	Pass in CHEM3341	Y	Y	1	Dec	40	Prof V W W Yam, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry

										(2017,2016,2015,2014, 2013,2012)	
CHEM4441	Advanced organic chemistry	6	Pass in CHEM3441	Y	Y	1	Dec	80	Prof D Yang, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM4443	Integrated organic synthesis	6	Pass in CHEM3441; or Pass in CHEM3441 (without lab component) and CHEM3443	Y	Y	2	May	50	Prof P Chiu, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM4444	Chemical biology	6	Pass in BIOC3601 or CHEM3441	Y	Y	2	May	50	Dr X C Li, Chemistry	Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Biochemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM4541	Physical chemistry III: statistical thermodynamics and kinetics theory	6	Pass in CHEM3541	N	N			40	, Chemistry	Major in Chemistry (2013,2012); Minor in Chemistry (2013,2012)	
CHEM4542	Computational chemistry	6	Pass in CHEM3541 or PHYS3351	N	Y			60	Prof G H Chen, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM4543	Advanced physical chemistry	6	Pass in CHEM3541	Y	Y	2	May	40	Prof G H Chen, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM4544	Electrochemical science and technology	6	Pass in CHEM3542	Y	N	2	May	36	Prof G K Y Chan, Chemistry	Major in Chemistry (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	
CHEM4910	Chemistry literacy and research	6	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major including CHEM3241, and CHEM3341, and CHEM3441, and CHEM3541. This capstone course is for Chemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	2	No exam		Dr X Li, Chemistry	Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	Major in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4911	Capstone experience for chemistry undergraduates: HKUtopia	6	Students are expected to have satisfactorily completed all introductory chemistry disciplinary core courses and at least 24 credits of advanced level disciplinary core/elective chemistry courses in the Chemistry Major.	Y	Y	S	No exam		Dr A P L Tong, Chemistry	Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	Major in Chemistry (2017,2016,2015,2014, 2013,2012)

			Students who are interested in taking the course should contact the course coordinator for application in April - May. Late application may not be considered.  This capstone course is for Chemistry Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.									
CHEM4966	Chemistry internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major. This capstone course is for Chemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr H Y Au-Yeung, Chemistry		Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	Major in Chemistry (2017,2016,2015,2014, 2013,2012)
CHEM4999	Chemistry project	12	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major including CHEM3241, and CHEM3341, and CHEM3441. This capstone course is for Chemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam		Dr J Y Tang, Chemistry		Minor in Chemistry (2017,2016,2015,2014, 2013,2012)	Major in Chemistry (2017,2016,2015,2014, 2013,2012)
School of Ch	inese											
CSCI9001	Practical Chinese for science students	6	NIL	Υ	Y	1, 2	Dec, May		Mr K W Wong, Chinese			
Department of	of Earth Sciences				•			•		•		
EASC1020	Introduction to climate science	6	NIL	Y	Y	2	May		Dr Z H Liu, Earth Sciences		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013)	
EASC1401	Blue Planet	6	NIL	Y	Y	1, 2	Dec, May		Dr P Bach, Earth Sciences	Major in Earth System Science (2017,2016,2015,2014, 2013,2012)	Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
EASC1402	Principles of geology	6	NIL	Y	Y	1	Dec		Prof M Sun, Earth Sciences	Major in Earth System Science (2016,2015,2014,2013, 2012); Major in Geology (2017,2016,2015,2014, 2013,2012)	Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC1403	Geological heritage of Hong Kong	6	NIL	Υ	Y	2	May	35	Prof M F Zhou, Earth Sciences			
EASC1404	Early life on earth	6	NIL	N	N			50	TBC, Earth Sciences			
EASC1405	Peaceful use of nuclear technologies	6	NIL	N	Y				Dr S H Li, Earth			

				l	1				Sciences		[		
EASC1406	Introduction to the earth-life system	6	Pass in EASC1401	Y	Y	2	May		Dr Y L Li, Earth Sciences	Major in Earth System Science (2017)			
EASC2401	Fluid/solid interactions in earth processes	6	Pass in EASC1401 or EASC1402	Y	Y	2	Мау		Dr K H Lemke, Earth Sciences	Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012)	Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)		
EASC2402	Field and laboratory methods	6	Pass in EASC1401 or EASC1402	Y	Y	1	No exam	40	Dr P Bach, Earth Sciences	Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012)			
EASC2404	Introduction to atmosphere and hydrosphere	6	Pass in EASC1401 or EASC1402	Y	Y	1	Dec	50	Dr J R Ali, Earth Sciences	Major in Earth System Science (2017,2016,2015,2014, 2013,2012)	Major in Environmental Science (2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)		
EASC2406	Geochemistry	6	Pass in EASC1402	Y	Y	1	Dec		Dr D Chung, Earth Sciences	Major in Geology (2017,2016,2015,2014, 2013,2012)			
EASC2407	Mineralogy	6	Pass in EASC1402	Y	Y	1	Dec	30	Prof M Sun, Earth Sciences	Major in Geology (2017,2016,2015,2014, 2013,2012)			
EASC2408	Planetary geology	6	Pass in EASC1401 or EASC1402 or PHYS1650	Y	Y	2	May		Dr M H Lee, Earth Sciences	Major in Astronomy (2017,2016,2015,2014, 2013,2012)			
EASC2409	Regional field studies	6	Pass in EASC1401 or EASC1402; and consent of course coordinator	Y	Y	1	No exam	40	Dr J R Ali, Earth Sciences				
EASC2410	Data analysis and modeling in earth sciences	6	Pass in EASC1401	N	Y				TBC, Earth Sciences	Major in Earth System Science (2017)			
EASC3020	Global change: anthropogenic impacts	6	Pass in EASC2404 or ENVS2001	N	Y				Dr Z H Liu, Earth Sciences		Major in Earth System Science (2017); Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Minor in Earth Sciences (2017, 2016, 2015, 2014, 2013, 2012); Minor in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012)		
EASC3402	Petrology	6	Pass in EASC2407	Y	Y	2	May		Prof G Zhao, Earth Sciences	Major in Geology (2017,2016,2015,2014, 2013,2012)	Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)		
EASC3403	Sedimentary environments	6	Pass in EASC2402 or EASC3402	Y	Y	2	Мау		Dr J King, Earth Sciences	Major in Geology (2017,2016,2015,2014, 2013,2012)	Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)		
EASC3404	Structural geology	6	Pass in EASC2402 and EASC3402	Y	Y	1	Dec	40	Dr J R Ali, Earth Sciences	Major in Geology (2017,2016,2015,2014,	Minor in Earth Sciences		

										2013,2012)	(2017,2016,2015,2014, 2013,2012)	
EASC3405	Environmental remote sensing	6	Pass in EASC2404 or EASC2406 or EASC2407 or ENVS2002	Y	Y	2	No exam	36	Dr J Michalski, Earth Sciences		Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in	
EASC3406	Reconstruction of past climate	6	Pass in EASC2401	Y	N	2	May		Dr S H Li, Earth Sciences		Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC3408	Geophysics	6	Pass in EASC2401 or EASC2402 or PHYS2250	Y	Y	2	May		Prof P P C Wu, Earth Sciences	Major in Geology (2017,2016,2015,2014, 2013,2012)	Major in Earth System Science (2016,2015,2014,2013, 2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC3409	Igneous and metamorphic petrogenesis	6	Pass in EASC3402	Y	Y	2	May	30	Prof M Sun, Earth Sciences	Major in Geology (2017,2016,2015,2014, 2013,2012)	Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC3410	Hydrogeology	6	Pass in EASC2402	Y	Y	1	Dec	40	Prof J J Jiao, Earth Sciences		Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC3412	Earth resources	6	Pass in EASC2402 or EASC3402	Y	Y	1	Dec	40	Prof M F Zhou, Earth Sciences		Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC3413	Engineering geology	6	Pass in EASC3410 and EASC3414, or already enrolled in these courses This course is only for final year students.	Y	Y	2	May	35	Dr L N Y Wong, Earth Sciences		Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC3414	Soil and rock mechanics	6	Pass in EASC3410, or already enrolled in this course	Y	Y	2	May	40	Prof J J Jiao, Earth Sciences		Major in Geology (2017,2016,2015,2014,	

											2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC3415	Meteorology	6	Pass in EASC2404	Y	Y	1	Dec		Dr Z H Liu, Earth Sciences		Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC3416	Advanced geochemistry and geochronology	6	Pass in EASC2401 or EASC2406 or EASC2407	N	Z			50	Prof M F Zhou, Earth Sciences		Major in Earth System Science (2016,2015,2014,2013, 2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC3417	Earth through time	6	Pass in EASC3403	Y	Y	1	Dec		Dr S C Chang, Earth Sciences		Major in Earth System Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Geology (2017, 2016, 2015, 2014, 2013, 2012); Minor in Earth Sciences (2017, 2016, 2015, 2014, 2013, 2012)	
EASC3418	Earth surface processes	6	Pass in EASC2401 and EASC2402	N	N				TBC, Earth Sciences		Major in Earth System Science (2017)	
EASC3999	Directed studies in earth sciences	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth System Science Majors; and Cumulative GPA of 2.5 or above. This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors.  The earliest that a student is allowed to take this course is their year 3 study.	Y	Y	0	No exam		Prof M Sun, Earth Sciences		Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC4403	Biogeochemical cycles	6	Pass in EASC3403 or EASC3416 or ENVS3313	Y	Y	1	Dec		Dr Y Li, Earth Sciences	Major in Earth System Science (2017,2016,2015,2014, 2013,2012)	Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC4406	Earth dynamics & global tectonics	6	Pass in EASC3403 or EASC3404 or EASC3408 or EASC3409	Y	Y	2	May		Prof G Zhao, Earth Sciences	Major in Geology (2017,2016,2015,2014, 2013,2012)	Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC4407	Regional geology	6	Pass in EASC3402; and (EASC3403 or EASC3404)	Y	Y	1	No exam	40	Dr A A G Webb, Earth Sciences		Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	
EASC4408	Special topics in earth sciences	6	Pass in any EASC3XXX or EASC4XXX course	N	N			30	Dr M H Lee, Earth Sciences		Major in Earth System Science (2017,2016,2015,2014,	

											2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences		
											(2017,2016,2015,2014, 2013,2012)		
EASC4911	Earth system: contemporary issues	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Earth System Science Major including at least two of the following courses: EASC3410, EASC3415 or ENVS3313. This capstone course is for Earth System Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	2	No exam		Dr S C Chang, Earth Sciences		Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	Major in Earth System Science (2017,2016,2015,2014, 2013,2012)	
EASC4955	Integrated field studies	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology Major.  This must include either a PASS in, or student must be already enrolled in EASC3403, EASC3409.  This capstone course is for Geology Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	2	No exam	35	Dr J A King, Earth Sciences		Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)	Major in Geology (2017,2016,2015,2014, 2013,2012)	
EASC4966	Earth sciences internship	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth System Science Majors. This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors.  The earliest that a student is allowed to take this course is their year 3 study.	>	<b>Y</b>	1, 2, S	No exam		Dr X R Zuo, Earth Sciences		Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)		
EASC4999	Earth sciences project	12	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth System Science Majors; and Cumulative GPA of 2.7 or above. This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors. The earliest that a student is allowed to take this course is their year 3 study.	Y	Y	0	No exam		Prof M Sun, Earth Sciences		Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Earth Sciences (2017,2016,2015,2014, 2013,2012)		
ENVS1401	Introduction to environmental science	6	NIL	Y	Y	1	Dec		Dr C A Not, Earth Sciences	Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)			
ENVS3004	Environment, society and economics	6	Pass in one of the following courses: CHEM2041, EASC2404, ENVS2001 or ENVS2002	Y	Y	1	Dec		Prof Y Q Zong, Earth Sciences	Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science			

										(2017,2016,2015,2014, 2013,2012)		
ENV\$3007	Natural hazards and mitigation	6	Pass in EASC2404 or ENVS2001 or ENVS2002	N	Y				Prof P P C Wu, Earth Sciences		Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
ENVS3042	Pollution	6	Pass in EASC2401 or CHEM2241 or BIOL2103 or ENVS2001	Y	Y	1	No exam	50	Dr B Thibodeau, Earth Sciences		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
ENVS3313	Environmental oceanography	6	Pass in BIOL2306 or EASC2404 or ENVS2001 or ENVS2002	Y	Y	2	May		Dr C A Not, Earth Sciences	Minor in Marine Biology (2017, 2016, 2015, 2014, 2013, 2012)	Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
ENVS3999	Directed studies in environmental science	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major. Cumulative GPA of 2.5 or above in Environmental Science Major. This capstone course is for Environmental Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	2	No exam		Dr Z H Liu, Earth Sciences			Major in Environmental Science (2017,2016,2015,2014, 2013,2012)
ENVS4955	Environmental science in practice	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major. This capstone course is for Environmental Science Major students only. The earliest that a student is allowed to take this course is their year 3 study	Y	Y	2	No exam	10	Dr M Yasuhara, Biological Sciences			Major in Environmental Science (2017,2016,2015,2014, 2013,2012)
ENVS4966	Environmental science internship	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major. This capstone course is for Environmental Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr C Dingle, Biological Sciences			Major in Environmental Science (2017,2016,2015,2014, 2013,2012)
ENVS4999	Environmental science project	12	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary	Y	Y	0	No exam		Dr Z H Liu, Earth Sciences			Major in Environmental Science

			core/elective courses in Environmental Science Major; and Students must have a cumulative GPA of 3.0 or above in Environmental Science Major. This capstone course is for Environmental Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.									(2017,2016,2015,2014, 2013,2012)
Department	of Mathematics						•			•		
MATH1009	Basic mathematics for business and economics	6	NIL The course has no pre-requisite, but students are expected to have already achieved Level 2 or above in HKDSE Mathematics or equivalent. Not for students who have passed MATH1011 or MATH1013, or have already enrolled in these courses. This course is exclusively for non-Science and non-Engineering students (i.e. not for students from the Faculty of Science or Engineering).	Y	Y	1, 2	Dec, May	380	Dr Y M Chan (1st sem); Dr K H Law (2nd sem), Mathematics			
MATH1011	University mathematics I	6	NIL The course has no pre-requisite, but students are expected to have achieved Level 2 or above in HKDSE Mathematics or equivalent before enrolling the course; and Not for students with Level 2 or above in Module 1 or Module 2 of HKDSE Mathematics or equivalent.	Y	Y	1, 2	Dec, May		Dr H Y Zhang, Mathematics			
MATH1013	University mathematics II	6	Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1009 or MATH1011; and Not for students who have passed MATH1821, or (MATH1851 and MATH1853), or have already enrolled in this course.	Y	Y	1, 2	Dec, May	500	Dr C W Wong, Mathematics	Major in Decision Analytics (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Risk Management (2017, 2016, 2015, 2014, 2013, 2012); Major in Statistics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Computational & Financial Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Operations Research & Mathematical Programming (2017, 2016, 2015, 2014, 2013)	Minor in Actuarial Studies (2017, 2016, 2015, 2014, 2013, 2012)	
MATH1641	Mathematical laboratory and modeling	6	NIL	N	N			30	TBC, Mathematics			
MATH1821	Mathematical methods for actuarial science I	6	Level 4 or above in HKDSE Mathematics plus Module 1, or Level 4	Y	Y	1	Dec		Dr J T Chan, Mathematics	BSc in Actuarial Science		

			or above in HKDSE Mathematics plus Module 2, or equivalent; and Not for students who have passed MATH1013 or (MATH1851 and MATH1853), or have already enrolled in these courses. For BSc(ActuarSc) students only.							(2017,2016,2015,2014, 2013,2012)		
MATH1851	Calculus and ordinary differential equations	6	Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011. (This course is exclusively for Engineering students.)	Y	Y	1, 2	Dec, May	700	Prof K M Tsang (1st sem); Dr Y K Lau (2nd sem), Mathematics			
MATH1853	Linear algebra, probability and statistics	6	Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011. (This course is exclusively for Engineering students.)	Y	Y	1, 2	Dec, May	700	Prof W K Ching (1st sem); Dr G Han (2nd sem), Mathematics			
MATH2012	Fundamental concepts of mathematics	6	Pass in MATH1013 or MATH1821 or (MATH1851 and MATH1853)	Y	Y	1, 2	Dec, May		Dr Y M Chan (1st sem); Prof J H Lu (2nd sem), Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012)		
MATH2014	Multivariable calculus and linear algebra	6	Pass in MATH1013 or (MATH1851 and MATH1853). Not for students who have passed MATH2822 or [(MATH2101 or MATH2102) and MATH2211], or have already enrolled in these courses.	Y	Y	1, 2	Dec, May		Dr H Y Zhang, Mathematics	Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014) ; Major in Statistics (2017,2016,2015,2014)		
MATH2101	Linear algebra I	6	Pass in MATH1013 or MATH1821 or (MATH1851 and MATH1853)	Y	Y	1, 2	Dec, May		Dr K H Law, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research & Mathematical Programming (2017,2016,2015,2014, 2013)		
MATH2102	Linear algebra II	6	Pass in MATH2101 or (MATH1821 and MATH2822)	Y	Y	2	May		Prof W Zang, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012)		
MATH2211	Multivariable calculus	6	Pass in MATH1013 or MATH1821 or (MATH1851 and MATH1853)	Y	Y	1, 2	Dec, May		Dr Z Hua (1st sem); Prof W S Cheung (2nd sem), Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research		

										& Mathematical Programming (2017,2016,2015,2014, 2013)		
MATH2241	Introduction to mathematical analysis	6	Pass in MATH1013 or (MATH1851 and MATH1853) or MATH2822. Students are strongly recommended to have taken MATH2012 if they wish to take this course.	Y	Y	1, 2	Dec, May		Dr Y M Chan, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012)		
MATH2822	Mathematical methods for actuarial science II	6	Pass in MATH1821. For BSc(ActuarSc) students only.	Y	Y	2	May		Dr J T Chan, Mathematics	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)		
MATH3001	Development of mathematical ideas	6	Pass in MATH2101, MATH2102, MATH2211 and MATH2241	N	N				TBC, Mathematics		Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH3002	Mathematics seminar	6	Pass in MATH2012, MATH2101, MATH2211 and MATH2241 (This course is for second year BSc students only.)	N	Z			12	TBC, Mathematics		Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH3301	Algebra I	6	Pass in MATH2101	Y	Y	1	Dec		Dr Y K Lau, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)	Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH3303	Matrix theory and its applications	6	Pass in MATH2101 and MATH2102	N	N				TBC, Mathematics		Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH3304	Introduction to number theory	6	Pass in MATH2101 and MATH2211	Y	Y	2	May		Dr B Kane, Mathematics		Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH3401	Analysis I	6	Pass in MATH2211	Y	Y	1	Dec		Prof W S Cheung, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)	Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH3403	Functions of a complex variable	6	Pass in MATH2211 and MATH2241	Y	Y	1	Dec		Prof N Mok, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012)	Major in Mathematics/Physics (2017,2016,2015,2014,	

MATH3405	Differential equations	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	2	May	 Dr T K Wong, Mathematics		2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012) Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in	
										Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research & Mathematical Programming Programming 17,2016,2015,2014, 2013)	
MATH3408	Computational methods and differential equations with applications	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	2	May	 Prof W K Ching, Mathematics		Major in Decision Analytics (2017, 2016, 2015, 2014, 2013, 2012); Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Computational & Financial Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics (2017, 2016, 2015, 2014, 2013, 2012)	
MATH3541	Introduction to topology	6	Pass in MATH2101 and MATH2241. Students are recommended to have passed or already enrolled in MATH3301 and MATH3401.	N	Y			 Dr Z Hua, Mathematics		Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH3600	Discrete mathematics	6	Pass in (MATH1013 and any 1 of Level 2 MATH courses) or (MATH1851 and MATH1853 and any 1 of level 2 MATH courses) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	1	Dec	 Dr K H Law, Mathematics		Major in Decision Analytics (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Operations Research & Mathematical Programming (2017, 2016, 2015, 2014, 2013)	
MATH3601	Numerical analysis	6	Pass in (MATH2101 and MATH2211) or	Υ	Y	1	Dec	 Dr Z Zhang,	Minor in Computational	Major in Decision	

			MATH2014 or (MATH1821 and MATH2822)						Mathematics	& Financial Mathematics (2017,2016,2015,2014, 2013,2012)	Analytics (2017,2016,2015,2014, 2013,2012); Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in	
MATH3603	Probability theory	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	1	Dec	1	Dr Z Qu, Mathematics		Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH3901	Operations research I	6	Pass in MATH2014 or MATH2101 or MATH2102	Y	Y	2	May		Prof X Yuan, Mathematics	Minor in Operations Research & Mathematical Programming (2017,2016,2015,2014, 2013)	Major in Decision Analytics (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics (2017, 2016, 2015, 2014, 2013, 2012)	
MATH3904	Introduction to optimization	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	1	Dec		Prof W Zang, Mathematics	Major in Decision Analytics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Operations Research & Mathematical Programming (2017, 2016, 2015, 2014, 2013)	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH3905	Queueing theory and simulation	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	1	Dec		Dr G Han, Mathematics		Major in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Operations Research & Mathematical Programming (2017, 2016, 2015, 2014, 2013)	
MATH3906	Financial calculus	6	Pass in (MATH2101 and MATH2211) or	Υ	Y	1	Dec		Dr S P Yung,	Minor in Computational	Major in Mathematics	

			MATH2014 or (MATH1821 and MATH2822) or STAT2601					Mathematics	& Financial Mathematics (2017,2016,2015,2014, 2013,2012)	(2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research & Mathematical Programming (2017,2016,2015,2014, 2013)	
MATH3911	Game theory and strategy	6	Pass in (MATH2101 and MATH2211) or (MATH1821 and MATH2822)	Y	<b>Y</b>	2	May	 Dr K H Law, Mathematics		Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research & Mathematical Programming (2017,2016,2015,2014, 2013)	
MATH3943	Network models in operations research	6	Pass in (MATH2101 and MATH2211) or MATH2014; and Pass in MATH3901, or already enrolled in this course.	Z	<b>Y</b>			 Dr Z Zhang, Mathematics		Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research & Mathematical Programming (2017,2016,2015,2014, 2013)	
MATH3999	Directed studies in mathematics	6	Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATHAXXX), MATHAXXX or MATHAXXX) in the Mathematics, and Mathematics/Physics Majors, in addition to a pass in MATH2101, MATH2102, MATH2211 and MATH2241. Subject to approval by the Department. This capstone course is for Mathematics, and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam	 Prof T W Ng, Mathematics		Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)
MATH4302	Algebra II	6	Pass in MATH2102 and MATH3301	Y	Y	2	May	 Prof J H Lu, Mathematics		Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics	

									(2017,2016,2015,2014, 2013,2012)	
MATH4402	Analysis II	6	Pass in MATH3401	Y	Y	2	May	 Dr Y M Chan, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH4404	Functional analysis	6	Pass in MATH2101, MATH2102, MATH2211, MATH2241 and MATH3401	Y	Y	2	May	 Dr T K Wong, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH4406	Introduction to partial differential equations	6	Pass in MATH2101, MATH2102, MATH2241; and Pass in MATH3405, or already enrolled in this course.	Y	Y	1	Dec	 Dr H Y Zhang, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH4501	Geometry	6	Pass in (MATH2101 and MATH2211); and Pass in (MATH3401 or MATH3403 or MATH3405). Students are strongly recommended to have taken MATH3405.	Y	Y	1	Dec	 Dr C W Wong, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012)  Major in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH4511	Introduction to differentiable manifolds	6	Pass in MATH3401 (having taken MATH4501 would be helpful; the course can also be taken concurrently with MATH4402).	N	Y			 TBC, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH4602	Scientific computing	6	Pass in MATH3601	Y	N	2	May	 Dr Z Zhang, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH4902	Operations research II	6	Pass in MATH2101 and MATH2211; and Pass in MATH3901, or already enrolled in this course.	N	Y			 Dr G Han, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2017,2016,2015,2014,	

										2013,2012); Minor in Operations Research & Mathematical Programming (2017,2016,2015,2014, 2013)
MATH4907	Numerical methods for financial calculus	6	Pass in MATH3906 or equivalent.	N	Y				Dr C W Wong, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research & Mathematical Programming (2017,2016,2015,2014, 2013)
MATH4910	Senior mathematics seminar	6	Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics, and Mathematics/Physics Majors including MATH3301, MATH3401, and MATH3403.  Subject to approval by the Department. This capstone course is for Mathematics, and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	N	Y			12	Prof W S Cheung, Mathematics	Minor in Mathematics (2017,2016,2015,2014, 2013,2012)  Major in Mathematics (2017,2016,2015,2014, 2013,2012)  Major in Mathematics (2017,2016,2015,2014, 2013,2012)  Major in Mathematics (2017,2016,2015,2014, 2013,2012)
MATH4911	Mathematics capstone project	6	Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics, and Mathematics/Physics Majors. Subject to approval by the Department. This capstone course is for Mathematics, and Mathematics/Physics Majors students only. (This course is for third and fourth year students only. The earliest that a student is allowed to take this capstone course is their year 3 study.)	Y	Y	1	No exam		Dr S P Yung, Mathematics	Minor in Mathematics (2017,2016,2015,2014, 2013,2012)  Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)  Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics (2017,2016,2015,2014, 2013,2012)
MATH4966	Mathematics internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics, and Mathematics/Physics Majors. This capstone course is for Mathematics, and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr T K Wong, Mathematics	Minor in Mathematics (2017,2016,2015,2014, 2013,2012)  Major in Mathematics (2017,2016,2015,2014, 2013,2012)  Major in Mathematics (2017,2016,2015,2014, 2013,2012)  Major in Mathematics (2017,2016,2015,2014, 2013,2012)
MATH4999	Mathematics project	12	Pass in at least 24 credits of advanced level disciplinary core/elective	Y	Y	0	No exam		Prof T W Ng, Mathematics	Minor in Mathematics (2017,2016,2015,2014, Major in Mathematics (2017,2016,2015,2014)

			mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics, and Mathematics/Physics Majors including MATH3301, MATH3401, and MATH3403. Subject to approval by the Department. This capstone course is for Mathematics, and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study.						2013,2012)	2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)
MATH7101	Intermediate complex analysis	6	Pass in a first course in Complex Analysis such as MATH3403, and approval by the course coordinator.	Y	Y	1	Dec	 Prof N Mok, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH7201	Topics in geometry	6	Pass in (MATH4402 or MATH4501) and (MATH4511 or the approval of the course coordinator)	N	N			 TBC, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH7202	Complex manifolds	6	Pass in a first course in Complex Analysis such as MATH3403, a first course in Differential Geometry such as MATH4501, and approval by the course coordinator.	N	N			 TBC, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH7217	Topics in financial mathematics	6	Pass in an advanced level mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) and subject to the approval of the course coordinator.	N	N			 Dr J Song, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2017,2016); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH7219	Topics in applied functional analysis	6	Pass in MATH3401 and MATH4404, or approval of the course coordinator.	N	N			 TBC, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)	
MATH7224	Topics in advanced probability theory	6	Pass in MATH3603 and MATH4402, and approval of the course coordinator.	Y	N	2	Мау	 Dr J Song, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014,	

MATUTEOA	Today is about		Date is MATIMORO					De la la Malla constitu	2013,2012); Minor in Computational & Financial Mathematics (2017,2016); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)
MATH7501	Topics in algebra	6	Pass in MATH4302	N	N			 Dr J Liu, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)
MATH7502	Topics in applied discrete mathematics	6	Pass in (MATH3301 or MATH3600), and approval of the course coordinator.	N	Y			 Prof W Zang, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research & Mathematical Programming (2017,2016,2015,2014, 2013)
MATH7503	Topics in mathematical programming and optimization	6	Pass in MATH3901, MATH3904 and MATH4902	N	N			 TBC, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research & Mathematical Programming (2017,2016,2015,2014, 2013)
MATH7504	Geometric topology	6	Pass in MATH3301 and MATH3401	N	N			 TBC, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)
MATH7505	Real analysis	6	Pass in MATH3401	Y	Y	2	May	 Prof K M Tsang, Mathematics	Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012)
Department	· ·								
PHYS1050	Physics for engineering students	6	Level 3 or above in HKDSE Physics or Combined Science with Physics	Y	Y	1, 2	Dec, May	 Prof K S Cheng, Physics	

			components or equivalent; and (Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011) (This course is exclusive for Engineering students.)								
PHYS1055	How things work	6	NIL	Υ	Υ	2	May	 Dr M K Yip, Physics			
PHYS1056	Weather, climate and climate change	6	NIL	Υ	Υ	1	Dec	 Dr K M Lee, Physics			
PHYS1057	Kitchen science	6	NIL	N	N			 Prof A B Djurisic, Physics			
PHYS1150	Problem solving in physics	6	Level 3 or above in HKDSE Physics or equivalent; Students without Level 3 or above in HKDSE Physics but having a pass in PHYS1240 may be allowed to take this course.	Y	Y	2	Мау	 Dr S Z Zhang, Physics	Major in Physics (2014,2013,2012)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2017,2016,2015)	
PHYS1240	Physics by inquiry	6	NIL Not for students with level 3 or above in HKDSE Physics; and Not for students who have passed in PHYS1050, or already enrolled in this course; and Not for students who have passed in PHYS1250, or already enrolled in this course.	Y	Y	1	Dec	 Dr F K Chow, Physics			
PHYS1250	Fundamental physics	6	Level 3 or above in HKDSE Physics or equivalent; Students without Level 3 or above in HKDSE Physics but having a pass in PHYS1240 may be allowed to take this course; Not for students who have passed in PHYS1050, or already enrolled in this course.	Y	Y	1, 2	Dec, May	 Dr M K Yip, Physics	Major in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012)		
PHYS1650	Nature of the universe	6	NIL	Y	Y	1, 2	Dec, May	 Dr K M Lee, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012)		
PHYS2055	Introduction to relativity	6	Pass in PHYS1050 or PHYS1150 or PHYS1250	Y	Y	2	May	 Dr K M Lee, Physics		Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2017,2016,2015)	
PHYS2150	Methods in physics I	6	Pass in MATH1011 or MATH1013 or MATH1851 or PHYS1150	Y	Y	1	Dec	 Dr F K Chow, Physics		Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2017,2016,2015)	
PHYS2155	Methods in physics II	6	Pass in MATH1011 or MATH1013 or MATH1851 or PHYS1150	Y	Y	2	May	 Dr F K Chow, Physics		Major in Astronomy (2017,2016,2015);	

PHYS2250	Introductory mechanics	6	Pass in PHYS1050 or PHYS1250	Y	Y	1, 2	Dec, May	 Dr M K Yip, Physics	Major in Astronomy	Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2017,2016,2015)	
711132230	illuductory mechanics	Ü	F 455 III F 111 5 1050 01 F 111 5 1250	'	•	1, 2	Dec, May	 DI WITTIP, FTIYSICS	(2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2014,2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in	Mathematics/Physics (2017,2016,2015)	
PHYS2255	Introductory electricity and magnetism	6	Pass in PHYS1050 or PHYS1250	Y	Y	2	May	 Dr J C S Pun, Physics	Major in Astronomy (2014,2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015)	
PHYS2260	Heat and waves	6	Pass in PHYS1050 or PHYS1250	Y	Y	1	Dec	 Dr M Su, Physics	Major in Physics (2017,2016,2015,2014, 2013,2012)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015)	
PHYS2265	Modern physics	6	Pass in PHYS1050 or PHYS1250	Y	Y	1, 2	Dec, May	 Dr F K Chow, Physics	Major in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012)		
PHYS2850	Atomic and nuclear physics	6	Pass in PHYS2265	N	N			 Dr S Z Zhang, Physics			
PHYS3150	Theoretical physics	6	Pass in (PHYS2250 or PHYS2255 or PHYS2265) and (MATH2211 or PHYS2150)	Y	Y	1	Dec	 Prof Z D Wang, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in	
PHYS3350	Classical mechanics	6	Pass in PHYS2250	Y	Y	1	Dec	 Dr S Z Zhang, Physics	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012)	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
PHYS3351	Quantum mechanics	6	Pass in PHYS2265	Y	Y	1	Dec	 Prof W Yao, Physics	Major in Mathematics/Physics (2017,2016,2015,2014,	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in	

										2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012)	Physics (2017,2016,2015,2014, 2013,2012)	
PHYS3450	Electromagnetism	6	Pass in PHYS2255	Y	Y	2	May		Prof X D Cui, Physics	Major in Physics (2017,2016,2015,2014, 2013,2012)	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
PHYS3550	Statistical mechanics & thermodynamics	6	Pass in PHYS2260	Y	Y	2	May	1	Prof M H Xie, Physics	Major in Physics (2017,2016,2015,2014, 2013,2012)	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
PHYS3551	Introductory solid state physics	6	Pass in PHYS2260 and PHYS2265	N	Z				Prof J Gao, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in	
PHYS3650	Observational astronomy	6	Pass in PHYS1650 and (PHYS2250 or PHYS2265)	Y	Y	1	Dec	-	Dr J J L Lim, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012)	Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012)	
PHYS3651	The physical universe	6	Pass in PHYS1650 and (PHYS2250 or PHYS2265)	Y	Y	1	Dec		Dr S C Y Ng, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012)	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in	
PHYS3652	Principles of astronomy	6	Pass in PHYS1650 and (PHYS2250 or PHYS2265)	Y	Y	2	May		Dr J J L Lim, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012)	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics	

PHYS3750	Laser and spectroscopy	6	Pass in PHYS3551, or already enrolled	Y	N	2	May	 Prof S J Xu, Physics	(2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012) Major in Astronomy (2017,2016,2015,2014,
			in this course.						(2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in
PHYS3751	Physics of nanomaterials	6	Pass in PHYS3351; and Pass in PHYS3551, or already enrolled in this course.	N	N			 TBC, Physics	Major in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012)
PHYS3850	Waves and optics	6	Pass in PHYS2255 and PHYS2260	Y	Y	1	Dec	 Prof S J Xu, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Oliono in Physics (2017,2016,2015,2014, 2013,2012)
PHYS3851	Atomic and nuclear physics	6	Pass in PHYS2250, PHYS2255 and PHYS2265	Y	Y	1	Dec	 Dr J H C Lee, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS3999	Directed studies in physics	6	Pass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Physics Major, Mathematics/Physics Major or Astronomy Major curriculum. This capstone course is for Astronomy, Mathematics/Physics, and Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3	Y	Y	1, 2, S	No exam	 Prof K S Cheng, Physics	Minor in Physics (2017,2016,2015,2014, 2013,2012)  Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012)

			study.	1			1	l	1	1		
PHYS4150	Computational physics	6	Pass in (MATH3301 or MATH3401 or MATH3403 or MATH3405 or PHYS3150); and Pass in any three of the following courses: PHYS3350, PHYS3351, PHYS3450, PHYS3550	Y	Y	1	Dec		Prof J Wang, Physics	(20 201 Mat (20 201 Phy (20 201 Phy (20 (20	ujor in Astronomy 117,2016,2015,2014, 13,2012); Major in thematics/Physics 117,2016,2015,2014, 13,2012); Major in ysics 117,2016,2015,2014, 13,2012); Minor in ysics 117,2016,2015,2014, 117,2016,2015,2014, 117,2016,2015,2014,	
PHYS4151	Data analysis and modeling in physics	6	Pass in (MATH3301 or MATH3401 or MATH3403 or MATH3405 or PHYS3150); and Pass in any one of the following courses: PHYS3350, PHYS3351, PHYS3450, PHYS3550	N	N				Prof H F Chau, Physics	(20 201 Mat (20 201 Phy (20 201 Phy (20 (20)	jor in Astronomy 117, 2016, 2015, 2014, 13, 2012); Major in thematics/Physics 117, 2016, 2015, 2014, 13, 2012); Major in ysics 117, 2016, 2015, 2014, 13, 2012); Minor in ysics 117, 2016, 2015, 2014, 13, 2012); Minor in ysics 117, 2016, 2015, 2014, 13, 2012)	
PHYS4350	Advanced classical mechanics	6	Pass in PHYS3350	Y	Y	1	Dec		Prof S Q Shen, Physics	(20 201 Mat (20 201 Phy (20 201 Phy (20 (20	jor in Astronomy 117,2016,2015,2014, 13,2012); Major in thematics/Physics 117,2016,2015,2014, 13,2012); Major in ysics 117,2016,2015,2014, 13,2012); Minor in ysics 117,2016,2015,2014, 117,2016,2015,2014, 117,2016,2015,2014,	
PHYS4351	Advanced quantum mechanics	6	Pass in PHYS3351	Y	Y	2	May		Prof W Yao, Physics	Mathematics/Physics (2017,2016,2015,2014, 2013,2012) (20 201 Phy (20 (20 (20 (20 (20 (20 (20 (20 (20 (20	jor in Astronomy 117,2016,2015,2014, 13,2012); Major in ysics 117,2016,2015,2014, 13,2012); Minor in ysics 117,2016,2015,2014, 13,2012)	
PHYS4450	Advanced electromagnetism	6	Pass in PHYS3450	Y	Y	1	Dec		Prof X D Cui, Physics	(20 201 Mat (20 201 Phy (20 201 Phy (20 (20	jor in Astronomy 117,2016,2015,2014, 13,2012); Major in tthematics/Physics 117,2016,2015,2014, 13,2012); Major in ysics 117,2016,2015,2014, 13,2012); Minor in ysics 117,2016,2015,2014, 13,2012); Minor in ysics 117,2016,2015,2014, 13,2012)	
PHYS4550	Advanced statistical mechanics	6	Pass in PHYS3550	Y	Y	2	May		Dr Y J Tu, Physics	(20 201 Mai (20 201	jor in Astronomy 117,2016,2015,2014, 13,2012); Major in thematics/Physics 117,2016,2015,2014, 13,2012); Major in ysics	

PHYS4551	Solid state physics	6	Pass in (PHYS2255 or PHYS2260) and PHYS3351	Y	Y	2	May	 Prof J Wang, Physics	(2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)  Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in
PHYS4650	Stellar physics	6	Pass in PHYS3351 and PHYS3651	Y	Y	2	May	 Dr S C Y Ng, Physics	Physics (2017,2016,2015,2014, 2013,2012)  Major in Astronomy (2017,2016,2015,2014,
									2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS4651	Selected topics in astrophysics	6	Pass in PHYS3351 or PHYS3450 or PHYS3550 or PHYS3651	Y	N	1	Dec	 Prof K S Cheng, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in
PHYS4652	Planetary science	6	Pass in PHYS3651 or (PHYS3350 and PHYS3550)	Y	N	2	May	 Dr M H Lee, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS4653	Cosmology	6	Pass in PHYS3651 or PHYS3652	N	Y			 Prof K S Cheng, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics

									(2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS4654	General relativity	6	Pass in PHYS2055 and PHYS3350	Y	Y	2	May	 Dr M Su, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS4655	Interstellar medium	6	Pass in PHYS3651 or (PHYS3351 and PHY3550)	N	Y			 Dr M H Lee, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS4750	Experimental physics	6	TBC	N	N			 TBC, Physics	Major in Astronomy (2017,2016,2014, 2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS4850	Particle physics	6	Pass in PHYS3351	Y	Y	2	May	 Dr Y J Tu, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS4966	Physics internship	6	Pass in at least 24 credits of advanced	Y	Y	S	No exam	 Dr J C S Pun, Physics	Minor in Physics Major in Astronomy

			level (3XXX level or above) disciplinary core/elective courses of the Physics Major, Mathematics/Physics Major or Astronomy Major curriculum. This capstone course is for Astronomy, Mathematics/Physics, and Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study.						(2017,2016,2015,2014, 2013,2012)	(2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012)
PHYS4999	Physics project	12	Pass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Physics Major, Mathematics/Physics Major or Astronomy Major curriculum.  This capstone course is for Astronomy, Mathematics/Physics, and Physics Majors students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam	 Prof J Wang, Physics	Minor in Physics (2017,2016,2015,2014, 2013,2012)	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012)
PHYS7350	Graduate classical mechanics	6	Pass in PHYS4350	N	N			 TBC, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
PHYS7351	Graduate quantum mechanics	6	Pass in PHYS4351	Y	Y	2	May	 Prof S Q Shen, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
PHYS7450	Graduate electromagnetism	6	Pass in PHYS4450	N	Y			 Prof Z D Wang, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
PHYS7550	Graduate statistical mechanics	6	Pass in PHYS4550	N	Y			 Prof J Wang, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in	

										Physics (2017,2016,2015,2014, 2013,2012)	
PHYS7551	Graduate solid state physics	6	Pass in PHYS3551 and PHYS4351	N	N			 Prof J Wang, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
PHYS7650	Stellar atmospheres	6	TBC	N	N			 TBC, Physics		Major in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012)	
PHYS7750	Nanophysics	6	Pass in PHYS3551 and PHYS4351	N	N			 Prof S J Xu, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
ENVS3006	Environmental radiation	6	Pass in CHEM2041 or ENVS2001 or ENVS2002 or PHYS2265	N	N			 Dr J K C Leung, Physics		Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Minor in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012)	
ENVS3010	Sustainable energy and environment	6	Pass in CHEM2041 or ENVS2001 or ENVS2002 or PHYS2260	Y	Y	2	May	 Prof A B Djurisic, Physics		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
Faculty of So	cience										
SCNC1111	Scientific method and reasoning	6	NIL (This course is compulsory for all students taking a Science major offered by the Faculty of Science. Students should take this course in their first year.)	Y	Y	1, 2	Dec, May	 Dr K F Lam, Statistics & Actuarial Science	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Biochemistry (2017,2016,2015,2014, 2013,2012); Major in Biological Sciences (2017,2016,2015,2014,		

									2013,2012); Major in Chemistry (2017,2016,2015,2014, 2013,2012); Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in Earth System Science (2017,2016,2015,2014, 2013,2012); Major in Ecology & Biodiversity (2017,2016,2015,2014, 2013,2012); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Major in Food & Nutritional Science (2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012)	
SCNC1112	Fundamentals of modern science	6	NII. (This course is compulsory for all students taking a Science major offered by the Faculty of Science. Students should take this course in their first year.)	Y	Y	1, 2	Dec, May	 Dr J C S Pun, Physics	Major in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Major in Biochemistry (2017, 2016, 2015, 2014, 2013, 2012); Major in Biological Sciences (2017, 2016, 2015, 2014, 2013, 2012); Major in Chemistry (2017, 2016, 2015, 2014, 2013, 2012); Major in Decision Analytics (2017, 2016, 2015, 2014, 2013, 2012); Major in Earth System Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Ecology & Biodiversity (2017, 2016, 2015, 2014, 2013, 2012); Major in Ecology & Biodiversity (2017, 2016, 2015, 2014, 2013, 2012); Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Food & Nutritional Science	

										(2017,2016,2015,2014, 2013,2012); Major in Geology (2017,2016,2015,2014, 2013,2012); Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012)		
SCNC1113	The big history of our planet: a scientific perspective on everything that has ever happened	6	Level 3 or above in at least one science subject at the pre-university level (HKDSE Physics, Chemistry, Biology, Combined/Integrated Science or equivalent) This course is not offered to students in the 6901 BSc or 6119 BEd&BSc programmes.	Y	Y	2	No exam	50	Dr W M Y Cheung, Faculty			
SCNC2121	Sustainable food production	6	Students are expected to have passed at least 30 credits of level 1 and/or level 2 science courses. Students will also need to pass an interview in order to be enrolled in the course.	N	Y			32	Dr H S El-Nezami, Biological Sciences			
SCNC2122	Marine life science: a North East Pacific perspective	6	Students are expected to have passed at least 30 credits of level 1 and/or level 2 science courses. Students will also need to pass an interview in order to be enrolled in the course.	N	Y			32	Dr T Vengatesen, Biological Sciences			
SCNC3111	Frontiers of science honours seminar course	6	Pass in SCNC1111, SCNC1112 and a level 2 science course. Students who participated or will participate in ORF/SRF must take this course.	Y	Y	1	No exam	120	Dr R K W Lui, Faculty			
Department of	of Statistics & Actuarial Science											
STAT1600	Statistics: ideas and concepts	6	NIL	Y	Y	1, 2	Dec, May		Dr Y K Chung, Statistics & Actuarial Science	Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012)		
STAT1601	Elementary statistical methods	6	Level 2 or above in HKDSE Mathematics or equivalent; and Not for students with Level 2 or above in HKDSE Mathematics Extended Module 1 or 2; and Not for students who have passed or already enrolled in any of the following courses: STAT2901, STAT1602, STAT2601, STAT1603, ECON1280	N	Y				TBC, Statistics & Actuarial Science	Major in Environmental Science (2012)	Major in Environmental Science (2017,2016,2015,2014, 2013); Minor in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	

STAT1602	Business statistics	6	NIL Not for students who have passed or already enrolled in any of the following courses: STAT1601, STAT2601, STAT1603, STAT2901, ECON1280 (This course is exclusive for School of Business students.)	Y	Y	1, 2	Dec, May		Dr R W L Wong, Statistics & Actuarial Science		Minor in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT1603	Introductory statistics	6	(Level 2 or above in HKDSE Mathematics Extended Module 1 or 2 or equivalent) or (Pass in MATH1009 Basic mathematics for business and economics or MATH1011 or MATH1013, or already enrolled in these courses); and Not for students who have passed or already enrolled in any of these courses: STAT1601, STAT1602, STAT2601, STAT2901	Y	Y	1, 2	Dec, May		Dr E K F Lam, Statistics & Actuarial Science	Major in Environmental Science (2012)	Major in Environmental Science (2017, 2016, 2015, 2014, 2013); Minor in Risk Management (2017, 2016, 2015, 2014, 2013, 2012); Minor in Statistics (2017, 2016, 2015, 2014, 2013, 2012)	
STAT2601	Probability and statistics I	6	Pass or already enrolled in MATH2014, or (MATH2101 and MATH2211), for students admitted in 2014 or thereafter; or Pass in MATH1013, or already enrolled in this course, for students admitted in 2013 or before; or Pass in MATH1851 and MATH1853, for students admitted in 2013 or before; and Not for students who have passed in STAT1603, or already enrolled in this course; Not for students who have passed in STAT2901, or already enrolled in this course; Not for students who have passed in STAT2901, or already enrolled in this course; and Not for BSc(ActuarSc) students.	Y	Y	1, 2	Dec, May		Dr K P Wat, Statistics & Actuarial Science	Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012)	Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT2602	Probability and statistics II	6	Pass in STAT2601; and Not for students who have passed in STAT3902, or already enrolled in this course.	~	Y	2	May		Dr K Zhu, Statistics & Actuarial Science	Major in Decision Analytics (2017, 2016, 2015, 2014, 2013, 2012); Major in Risk Management (2017, 2016, 2015, 2014, 2013, 2012); Major in Statistics (2017, 2016, 2015, 2014, 2013, 2012)	Minor in Actuarial Studies (2017, 2016, 2015, 2014, 2013, 2012); Minor in Risk Management (2017, 2016, 2015, 2014, 2013, 2012); Minor in Statistics (2017, 2016, 2015, 2014, 2013, 2012)	
STAT2603	Data management with SAS	6	Pass in STAT1600 or MATH1821, or already enrolled in this course	Y	Y	1	Dec	50	Dr G C S Lui, Statistics & Actuarial Science	Major in Risk Management (2013,2012); Major in Statistics (2013,2012)	Minor in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT2605	Demographic and socio-economic statistics	6	(Level 2 or above in HKDSE Mathematics or Level 2 or above in HKDSE Mathematics Extended Module 1 or 2 or equivalent); and Pass or already enrolled in BIOL2102, ECON1280, STAT1601, STAT1602, STAT2601, STAT1603, STAT2901	Y	Y	2	May		Ms L M S Kwan, Statistics & Actuarial Science		Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT2901	Probability and statistics: foundations of actuarial science	6	Pass in MATH1821 [for BSc(ActuarSc) students] or already enrolled in this course, or Pass in MATH1013 or already enrolled in this course [for students outside the BSc(ActuarSc) programme]; and	Y	Y	2	May		Dr C W Kwan, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012)	

			Not for students who have passed or enrolled in any of these courses: STAT1601, STAT1602, STAT1603, STAT2601								
STAT2902	Financial mathematics	6	Pass in STAT2901, or already enrolled in this course; and Not for students who have passed in STAT3615, or already enrolled in this course.	Y	Y	2	May	 Prof K C Yuen, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)		
STAT3600	Linear statistical analysis	6	Pass in STAT2602; and Not for students who have passed in STAT3907, or have already enrolled in this course.	Y	Y	1	Dec	 Dr F Jiang, Statistics & Actuarial Science	Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012)	Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3602	Statistical inference	6	Pass in STAT2602 or STAT3902	Y	Y	1	Dec	 Prof S M S Lee, Statistics & Actuarial Science		BSc in Actuarial Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Statistics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Statistics (2017, 2016, 2015, 2014, 2013, 2012)	
STAT3603	Probability modelling	6	Pass in STAT2601; and Not for students who have passed in MATH3603, or have already enrolled in this course; and Not for students who have passed in STAT3903, or have already enrolled in this course.	Y	Y	1	Dec	 Dr K Zhu, Statistics & Actuarial Science	Major in Statistics (2017,2016,2015,2014, 2013,2012)	Major in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3604	Design and analysis of experiments	6	Pass in STAT2602 or STAT3611 or STAT3902	Y	Y	2	Мау	 Dr R W L Wong, Statistics & Actuarial Science		Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3605	Quality control and management	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2602 or (STAT1603 and any University level 2 course) or STAT3902	N	Y			 TBC, Statistics & Actuarial Science		Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3606	Business logistics	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901; and Not for students who have passed MATH3901, or have already enrolled in this course.	Y	Y	1	Dec	 Ms O T K Choi, Statistics & Actuarial Science		Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3607	Statistics in clinical medicine and biomedical research	6	Pass in STAT2602 or STAT3902	N	Y			 TBC, Statistics & Actuarial Science		Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014,	

	1						1			I	2013,2012)	
STAT3608	Statistical genetics	6	Pass in STAT2602 or STAT3902	N	Y				TBC, Statistics & Actuarial Science		Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3609	The statistics of investment risk	6	Pass in STAT2602, or already enrolled in this course, or Pass in (STAT1603 and any University level 2 course) or STAT3611 or STAT3614; and Not for students who have passed in FINA2320, or have already enrolled in this course; and Not for BSc(Actuarial Science) students	Y	Y	1	Dec		Dr K P Wat, Statistics & Actuarial Science	Major in Risk Management (2017,2016,2015,2014, 2013,2012)	Minor in Risk Management (2017,2016,2015,2014, 2013,2012)	
STAT3610	Risk management and insurance	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901. ((Not available to Actuarial Science students)	Y	Y	2	May		Dr R W L Wong, Statistics & Actuarial Science		Major in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012)	
STAT3611	Computer-aided data analysis	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or (STAT1603 and any University level 2 course) and Not for students who have passed in or have already enrolled in any of these courses: STAT2601, STAT2901, STAT291	N	N				Dr E K F Lam, Statistics & Actuarial Science		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3612	Data mining	6	Pass in STAT2602 or (STAT1603 and any University level 2 course) or STAT3902; and Pass in STAT3600 or STAT3907, or already enrolled in these courses.	Y	Y	2	No exam	50	Dr A J Zhang, Statistics & Actuarial Science	Major in Decision Analytics (2017,2016,2015,2014, 2013,2012)	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3613	Marketing engineering	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901	Y	Y	1	Dec	50	Dr C W Kwan, Statistics & Actuarial Science		Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3614	Business forecasting	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or (STAT1603 and any University level 2 course); and Not for students who have passed or	N	N				Dr R W L Wong, Statistics & Actuarial Science		Minor in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	

			already enrolled in any of these courses: STAT2601, STAT2901, STAT3907, STAT4601, ECON2280.									
STAT3615	Practical mathematics for investment	6	Pass in (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901; and Not for students who have passed in STAT2902, or have already enrolled in this course.	Y	Y	2	May		Dr A G Benchimol, Statistics & Actuarial Science	Major in Risk Management (2017,2016,2015,2014, 2013,2012)	Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012)	
STAT3616	Advanced SAS programming	6	Pass in STAT2601 or STAT2901 (Students are strongly recommended to take STAT2603 prior to taking this course.)	N	Y			50	TBC, Statistics & Actuarial Science		BSc in Actuarial Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Decision Analytics (2017, 2016, 2015, 2014, 2013, 2012); Major in Statistics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Statistics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Statistics (2017, 2016, 2015, 2014, 2013, 2012)	
STAT3617	Sample survey methods	6	Pass or already enrolled in BIOL2102, or (ECON1280 and any University level 2 course), or (STAT1601 and any University level 2 course), or (STAT1602 and any University level 2 course), or STAT2601, or (STAT1603 and any University level 2 course), or STAT2901.	Y	Y	2	May		Ms O T K Choi, Statistics & Actuarial Science		Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3618	Derivatives and risk management	6	Pass in STAT3615; and Not for students who have passed in STAT3910, or have already enrolled in this course; and Not for students who have passed in STAT3905, or have already enrolled in this course; and Not for students who have passed in FINA2322, or have already enrolled in this course; and Not for BSc(Actuarial Science) students.	Y	Y	1	Dec		Dr R W L Wong, Statistics & Actuarial Science		Major in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012)	
STAT3620	Modern nonparametric statistics	6	Pass in STAT2602 or STAT3902	Y	Y	1	Dec		Dr P L H Yu, Statistics & Actuarial Science		Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3621	Statistical data analysis	6	Pass in STAT3600 or STAT3907 (Students are strongly recommended to take STAT2603 prior to taking this course.)	Y	Y	2	May	50	Dr S K C Cheung, Statistics & Actuarial Science		Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3622	Data visualization	6	Pass in STAT2602 or STAT3902	Y	Y	1	No exam	50	Dr A J Zhang,		Major in Decision	

									Statistics & Actuarial Science		Analytics (2017,2016,2015,2014, 2013,2012)	
STAT3799	Directed studies in statistics	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Decision Analytics/Risk Management/Statistics Majors; and Not for students who have already enrolled in STAT4799 in this academic year. This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics; and subject to the consent of course coordinator. This course is mutually exclusive with STAT4710. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam	30	Prof S M S Lee, Statistics & Actuarial Science			Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012)
STAT3901	Life contingencies	6	(Pass in STAT2602 and STAT3615) or (Pass in STAT2902 and (Pass in STAT3902 or already enrolled in this course)) or (Pass in STAT2602 and STAT2902)	Y	Y	1	Dec		Prof K C Yuen, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012)	
STAT3902	Statistical models	6	Pass in STAT2901; and Not for students who have passed in STAT2602, or already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	1	Dec		Dr G C S Lui, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)		
STAT3903	Stochastic models	6	Pass in STAT2901; and Not for students who have passed in MATH3603, or have already enrolled in this course; and Not for students who have passed in STAT3603, or have already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	2	May		Prof J J F Yao, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)		
STAT3904	Corporate finance for actuarial science	6	[(Pass in ACCT1101 and STAT2902) or (Pass in STAT3610 and STAT3615)]; and Not for students who have passed in FINA1310, or have already enrolled in this course.	Y	Y	2	May		Dr D Lee, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012)	
STAT3905	Introduction to financial derivatives	6	Pass in STAT2902; and Not for students who have passed in STAT3618, or have already enrolled in this course; and Not for students who have passed in FINA2322, or have already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	1	Dec		Dr K C Cheung, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)		
STAT3906	Risk theory I	6	Pass in STAT3903, or already enrolled in this course; or Pass in MATH3603 or STAT3603	Y	Y	2	May		Dr K C Cheung, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012)	
STAT3907	Linear models and forecasting	6	Pass in STAT2602 or STAT3902, or already enrolled in this course; and Not for students who have passed in STAT3600, or have already enrolled in this course; and Not for students who have passed in STAT4601, or have already enrolled in	Y	Y	2	May		Dr G Li, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)		

			this course; and Not for students who have passed in ECON2280, or have already enrolled in this course; and For Bsc(Actuarial Science) students only.								
STAT3908	Credibility theory and loss distributions	6	Pass in STAT2602 or STAT3902 or STAT3906	Y	Y	1	Dec	 Dr A G Benchimol, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012)	
STAT3909	Advanced life contingencies	6	Pass in STAT3901, or already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	2	May	 Dr D Lee, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)		
STAT3910	Financial economics I	6	Pass in STAT2602 or STAT3902; and Not for students who have passed in STAT3618, or have already enrolled in this course; and Not for students who have passed in FINA2322, or have already enrolled in this course.	Y	Y	1	Dec	 Prof H L Yang, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012)	
STAT3911	Financial economics II	6	Pass in MATH3603 or STAT3603 or STAT3903 or STAT3910	Y	Y	2	Мау	 Prof H L Yang, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	Major in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012)	
STAT3951	Advanced contingencies	6	Pass in STAT3909; and Pass in STAT3910, or already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	1	Dec	 Dr D Lee, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	
STAT3952	Investment and asset management	6	Pass in STAT3901; and Not for students who have passed in FINA2320, or have already enrolled in this course; and For BSc(Actuarial Science) students only.	N	N			 TBC, Statistics & Actuarial Science		BSc in Actuarial Science (2012)	
STAT3953	Fundamentals of actuarial practice	6	Pass in STAT3909; and For BSc(Actuarial Science) students only.	Y	Y	1	No exam	 Mr P P Y Lau, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	
STAT3954	Current topics in actuarial science	6	Pass in STAT3901, or already enrolled in this course; or Pass in STAT3909, or already enrolled in this course; and For BSc(Actuarial Science) students only.	N	N			 TBC, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	
STAT3955	Survival analysis	6	Pass in STAT3902, or already enrolled in this course; or Pass in STAT3600 or STAT3901	Y	Y	2	May	 Dr J F Xu, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT3956	Pension funds and pension mathematics	6	Pass in STAT3909; and For BSc(Actuarial Science) students only.	N	Y			 Prof G Ma, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	

STAT4601	Time-series analysis	6	Pass in STAT3600; and Not for students who have passed in STAT3614, or have already enrolled in this course; and Not for students who have passed in STAT3907, or have already enrolled in this course.	Y	Y	1	Dec		Dr G Li, Statistics & Actuarial Science	Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012)	Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT4602	Multivariate data analysis	6	Pass in STAT3600 or STAT3907	Y	Y	2	May	50	Prof T W K Fung, Statistics & Actuarial Science	Major in Statistics (2017,2016,2015,2014, 2013,2012)	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012); Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Minor in Statistics (2017,2016,2015,2014, 2013,2012)	
STAT4603	Current topics in risk management	6	Pass in STAT3618 and STAT4601	Y	Y	2	May		Dr K P Wat, Statistics & Actuarial Science		Major in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012)	
STAT4606	Risk management and Basel Accords in banking and finance	6	Pass in STAT3618 or STAT3910 or STAT3905 or (FINA2322 and any University level 3 course)	Y	Y	2	May		Mr P K Y Pang, Statistics & Actuarial Science		Major in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012)	
STAT4607	Credit risk analysis	6	Pass in STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any University level 3 course)	Y	Y	1	Dec		Dr K P Wat, Statistics & Actuarial Science		BSc in Actuarial Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Risk Management (2017, 2016, 2015, 2014, 2013, 2012); Minor in Risk Management (2017, 2016, 2015, 2014, 2013, 2012)	
STAT4608	Market risk analysis	6	Pass in STAT3907 and STAT3910; or Pass in STAT4601 and (FINA2320 or STAT3609)	Y	Y	2	May		Dr Z Zhang, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014, 2013,2012); Minor in Risk Management (2017,2016,2015,2014, 2013,2012)	
STAT4609	Big data analytics	6	Pass in STAT3612	Y	Υ	2	No exam	50	Dr G C S Lui, Statistics & Actuarial Science	Major in Decision Analytics (2017,2016,2015,2014, 2013,2012)		
STAT4710	Capstone experience for statistics undergraduates	6	Students are expected to have satisfactorily completed at least 24 credits of advanced level disciplinary core/elective courses in the Decision Analytics/Risk Management/Statistics Majors. Students who are interested in taking the course should submit their	Y	Y	1, 2	No exam	50	Prof G Yin, Statistics & Actuarial Science			Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in

			applications to the Department. This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics, and is mutually exclusive with STAT3799, STAT4766 and STAT4799. The earliest that a student is allowed to take this capstone course is their year 3 study.								Statistics (2017,2016,2015,2014, 2013,2012)
STAT4711	Capstone experience for actuarial science undergraduates	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including (Pass in STAT3901, or already enrolled in this course; or Pass in STAT3909, or already enrolled in this course); and This capstone course is only for BSc (Actuarial Science) students, and is mutually exclusive with STAT4767 and STAT4798. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam	50	Prof G Yin, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)
STAT4766	Statistics internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Decision Analytics/Risk Management/Statistics Majors. This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics; and is mutually exclusive with STAT4710. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr C W Kwan, Statistics & Actuarial Science		Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012)
STAT4767	Actuarial science internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including STAT3901; and This capstone course is only for BSc (Actuarial Science) students; and is mutually exclusive with STAT4711. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Dr A G Benchimol, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)
STAT4798	Statistics and actuarial science project	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including STAT3902 and STAT3907; and Pass or already enrolled in at least one of the following courses: STAT3616, STAT3911, STAT4602; and This capstone course is only for BSc (Actuarial Science) students; and subject to the consent of course coordinator. This course is mutually exclusive with STAT4711. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam	50	Prof S M S Lee, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)
STAT4799	Statistics project	12	Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Decision Analytics/Risk Management/Statistics Majors including	Y	Y	0	No exam	30	Prof S M S Lee, Statistics & Actuarial Science		Major in Decision Analytics (2017,2016,2015,2014, 2013,2012); Major in

			STAT3600; and Pass or already enrolled in at least one of the following courses: STAT3612, STAT3911, STAT4601, STAT4602; and Not for students who have already enrolled in STAT3799 in this academic year. This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics; and subject to the consent of course coordinator. This course is mutually exclusive with STAT4710. The earliest that a student is allowed to take this capstone course is their year 3 study.								Risk Management (2017,2016,2015,2014, 2013,2012); Major in Statistics (2017,2016,2015,2014, 2013,2012)
STAT4901	Risk theory II	6	Pass in STAT3906	N	Y				TBC, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	
STAT4902	Selected topics in actuarial science	6	Pass in STAT3906	N	N				TBC, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	
STAT4903	Actuarial techniques for general insurance	6	Pass in STAT3906	Y	Y	2	May		Dr A G Benchimol, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012); Minor in Actuarial Studies (2017,2016,2015,2014, 2013,2012)	
STAT7609	Research methods in statistics	6	Pass in STAT3600 or STAT3907	Y	Y	1	Dec		Dr J F Xu, Statistics & Actuarial Science		
STAT7610	Advanced probability	6	Pass in STAT3603 or STAT3903	Y	Y	1	Dec		Dr J Song, Mathematics		
STAT7611	Computational statistics	6	Pass in STAT3600 or STAT3907	Y	Y	1	Dec		Prof G Yin, Statistics & Actuarial Science		
STAT7614	Advanced statistical modelling	6	Pass in STAT3600 or STAT3907	Y	Y	2	May		Dr Y K Chung, Statistics & Actuarial Science		
STAT7615	Advanced quantitative risk management and finance	6	Pass in STAT4608	Y	Y	2	May		Prof W K Li, Statistics & Actuarial Science		
Common Co	re Courses										
CCCH9020	Science and Technology: Lessons from China	6	NIL	Y	Y	1	Dec	120	Dr W M Y Cheung, Faculty		
CCCH9052	Arts, Science and Artifacts in Chinese Cultural Heritage	6	NIL	Y	Y	2	No exam	120	Prof Q A Parker, Physics		
CCGL9016	Feeding the World	6	NIL	Υ	Υ	1	No exam	120	Dr G V Akom, Faculty		
CCGL9033	Weapons of Mass Destruction: Science, Proliferation and Terrorism	6	NIL	Y	Y	2	No exam	120	Dr K H Lemke, Earth Sciences		
CCST9012	Our Place in the Universe	6	NIL	Y	Y	2	May	126	Dr T D Wotherspoon, Faculty		
CCST9013	Our Living Environment	6	NIL	Y	Y	2	No exam	120	Dr S C Chang, Earth Sciences		
CCST9014	Science and Music	6	NIL	Y	Y	2	No exam	120	Prof H F Chau, Physics		
CCST9017	Hidden Order in Daily Life: A Mathematical Perspective	6	NIL	Y	Y	1	No exam	120	Prof T W Ng, Mathematics		

CCST9018	Origin and Evolution of Life	6	NIL	Y	Y	2	No exam	120	Dr K H Lemke, Earth Sciences
CCST9019	Understanding Climate Change	6	NIL	Y	Y	2	No exam	126	5 Dr Z H Liu, Earth Sciences
CCST9021	Hong Kong: Our Marine Heritage	6	NIL	Y	Y	2	No exam	126	Frof K M Y Leung, Biological Sciences
CCST9022	How the Mass Media Depicts Science, Technology and the Natural World	6	NIL	Y	Y	1	No exam	120	Prof H F Chau, Physics
CCST9023	The Oceans: Science and Society	6	NIL	Y	Y	1	No exam	126	S Dr J A King, Earth Sciences
CCST9026	Scientific Revolutions: Their Continuing Impact on Our World and Society	6	NIL	Y	Y	1	No exam	126	B Prof Q A Parker, Physics
CCST9030	Forensic Science: Unmasking Evidence, Mysteries and Crimes	6	NIL	Y	Y	1, 2	No exam	126	Prof D L Phillips, Chemistry
CCST9036	Material World: Past, Present, and Future	6	NIL	Y	Y	2	No exam	120	Prof W K Chan, Chemistry
CCST9037	Mathematics: A Cultural Heritage	6	NIL	Y	Y	2	No exam	126	Dr B R Kane, Mathematics
CCST9038	Science and Science Fiction	6	NIL	Y	Y	1	No exam	126	Prof A B Djurisic, Physics
CCST9039	Statistics and Our Society	6	NIL	Y	Y	2	May	120	Prof W K Li, Statistics & Actuarial Science
CCST9043	Time's Arrow	6	NIL	Y	Y	2	May	126	Dr Y L Li, Earth Sciences
CCST9045	The Science and Lore of Culinary Culture	6	NIL	Y	Y	2	No exam	126	B Dr A M Y Yuen, Chemistry
CCST9046	The Science of Mind-body-health Relationship	6	NIL	Y	Y	1	Dec	126	Dr G W Porter, Faculty
CCST9048	Simplifying Complexity	6	NIL	Y	Y	1	No exam	120	Dr T D Wotherspoon, Faculty
CCST9051	What are We Made of - the Fundamental Nature of Matter	6	NIL	Y	Y	2	No exam	126	Prof S Xu, Physics
CCST9052	Coffee, Cigarettes, and Alcohol	6	NIL	Υ	Υ	2	No exam	126	Dr G W Porter, Faculty
CCST9054	War, Peace, and the Natural World	6	NIL	Y	Y	2	No exam	126	B Dr D M Baker, Biological Sciences
CCST9056	The Force is with You: How Things Work	6	NIL	Y	Y	2	No exam	126	Dr F C C Ling, Physics

Equivalency of HKDSE and

other qualifications

# SCIENCE

## SECTION V Equivalency of HKDSE and other qualifications

# **Table of Equivalence between HKDSE and Other Qualifications**

нирсе	G 1	Equivalent Qualification to HKDSE					
HKDSE	Grade	IB	GCE	SATII	AP	Gao Kao (高考)	
Biology	3 or above	Biology (SL/HL)	Biology (AL)	Biology	Biology		
Chemistry	3 or above	Chemistry (SL/HL)	Chemistry (AL)	Chemistry	Chemistry		
Physics	3 or above	Physics (SL/HL)	Physics (AL)	Physics	Physics B or C	Equivalent to fulfillment of all	
Mathematics	2 or above	Mathematics (SL)/Mathematical Studies (SL)	Mathematics (AL)	Mathematics Level 1 or 2		HKDSE requirements	
Mathematics + (M1 or M2)	2 or above	Mathematics (HL)/Mathematical Studies (HL)	Pure Mathematics (AL) Further Mathematics (AL)		Calculus AB or BC		

Note:

HL: Higher Level SL: Standard Level AL: Advanced Level

## Remarks:

For science students admitted through non-JUPAS scheme, the equivalent subject qualification(s) to HKDSE, if possessed, can be identified by the SIS for on-line course selection.

For other non-science students admitted through non-JUPAS scheme, they are still required to obtain the written approval from the Course Selection Adviser of the course offering department even they have possessed the equivalent HKDSE subject qualification(s) to meet the course prerequisite requirement. Once approval is given, they need to forward it to their home faculties to add the course on-line.

Science Majors in 2017-18

# SCIENCE

# SECTION VI Science Majors on offer in 2017/18

# **Majors offered by Science Faculty**

# **Majors** (16)

Statistics

Astronomy
Biochemistry
Biological Sciences
Chemistry
Decision Analytics
Earth System Science
Ecology & Biodiversity
Environmental Science
Food & Nutritional Science
Geology
Mathematics
Mathematics/Physics
Molecular Biology & Biotechnology
Physics
Risk Management

Major Title Major in Astronomy

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

## Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

## **Disciplinary Electives (6 Credits)**

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introduction to relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

#### 2. Advanced level courses (42 credits) Disciplinary Core Courses (18 credits)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

## Disciplinary Electives (24 credits)

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

II.		
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3551	Introductory solid state physics (6)	
PHYS3750	Laser and spectroscopy (6)	
PHYS3751	Physics of nanomaterials (6)	
PHYS3850	Waves and optics (6)	
PHYS3851	Atomic and nuclear physics (6)	
PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4350	Advanced classical mechanics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4654	General relativity (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requirement (6	credits)	
At least 6 credits selected	from the following courses:	
PHYS3999	Directed studies in physics (6)	
PHYS4966	Physics internship (6)	
PHYS4999	Physics project (12)	

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 5. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks

Major Title Major in Astronomy

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

**Disciplinary Elective (6 credits)** 

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introduction to relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

#### 2. Advanced level courses (42 credits) Disciplinary Core Courses (18 credits)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

## Disciplinary Electives (24 credits)

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6) PHYS4652 Planetary science (6)

PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

II.	
PHYS3550	Statistical mechanics & thermodynamics (6)
PHYS3551	Introductory solid state physics (6)
PHYS3750	Laser and spectroscopy (6)
PHYS3751	Physics of nanomaterials (6)
PHYS3850	Waves and optics (6)
PHYS3851	Atomic and nuclear physics (6)
PHYS4150	Computational physics (6)
PHYS4151	Data analysis and modeling in physics (6)
PHYS4350	Advanced classical mechanics (6)
PHYS4351	Advanced quantum mechanics (6)
PHYS4450	Advanced electromagnetism (6)
PHYS4550	Advanced statistical mechanics (6)
PHYS4551	Solid state physics (6)
PHYS4654	General relativity (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
PHYS7351	Graduate quantum mechanics (6)
PHYS7450	Graduate electromagnetism (6)
PHYS7550	Graduate statistical mechanics (6)
PHYS7551	Graduate solid state physics (6)
PHYS7750	Nanophysics (6)
3. Capstone requirement (6 credits)	
At least 6 credits selected from the folio	owing courses:
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)
PHYS4999	Physics project (12)

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks

Major Title Major in Astronomy

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
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- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

## Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

**Disciplinary Electives (6 credits)** 

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introduction to relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

#### 2. Advanced level courses (42 credits) Disciplinary Core Courses (18 credits)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

Disciplinary Electives (24 credits)

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6) PHYS4652 Planetary science (6)

PHYS4652 PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

II .		
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3551	Introductory solid state physics (6)	
PHYS3750	Laser and spectroscopy (6)	
PHYS3751	Physics of nanomaterials (6)	
PHYS3850	Waves and optics (6)	
PHYS3851	Atomic and nuclear physics (6)	
PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4350	Advanced classical mechanics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4654	General relativity (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requirement (	6 credits)	
At least 6 credits selected	from the following courses:	
PHYS3999	Directed studies in physics (6)	
PHYS4966	Physics internship (6)	
PHYS4999	Physics project (12)	

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks

Major Title Major in Astronomy

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
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- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

## Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2265 Modern physics (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

#### **Disciplinary Electives (24 credits)**

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)
PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)

PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)
PHYS3850 Waves and optics (6)

PHYS3851 Atomic and nuclear physics (6)
PHYS4150 Computational physics (6)

Data analysis and modeling in physics (6) **PHYS4151** Advanced classical mechanics (6) **PHYS4350** Advanced quantum mechanics (6) PHYS4351 PHYS4450 Advanced electromagnetism (6) Advanced statistical mechanics (6) PHYS4550 PHYS4551 Solid state physics (6) General relativity (6) **PHYS4654** Experimental physics (6) PHYS4750 PHYS4850 Particle physics (6) PHYS7350 Graduate classical mechanics (6) Graduate quantum mechanics (6) PHYS7351 **PHYS7450** Graduate electromagnetism (6) Graduate statistical mechanics (6) PHYS7550 PHYS7551 Graduate solid state physics (6) Nanophysics (6) PHYS7750 3. Capstone requirement (6 credits) At least 6 credits selected from the following courses: Directed studies in physics (6) PHYS3999 **PHYS4966** Physics internship (6) PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks:

Major Title Major in Astronomy

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

## Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits) Scientific method and reasoning (6) **SCNC1111 SCNC1112** Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

Fundamental physics (6) PHYS1250 Nature of the universe (6) PHYS1650 EASC2408 Planetary geology (6) PHYS2250 Introductory mechanics (6)

**PHYS2255** Introductory electricity and magnetism (6)

Modern physics (6) PHYS2265

2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

**PHYS3650** Observational astronomy (6) PHYS3651 The physical universe (6) Principles of astronomy (6) **PHYS3652** 

#### **Disciplinary Electives (24 credits)**

At least 12 credits selected from courses in List A:

List A

**PHYS4650** Stellar physics (6)

Selected topics in astrophysics (6) **PHYS4651 PHYS4652** Planetary science (6) **PHYS4653** Cosmology (6)

Interstellar medium (6) **PHYS4655** Stellar atmospheres (6) PHYS7650

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6) Classical mechanics (6) **PHYS3350** PHYS3351 Quantum mechanics (6) Electromagnetism (6) PHYS3450

Statistical mechanics & thermodynamics (6) **PHYS3550** 

Introductory solid state physics (6) PHYS3551 Laser and spectroscopy (6) PHYS3750 PHYS3751 Physics of nanomaterials (6)

**PHYS3850** Waves and optics (6) Atomic and nuclear physics (6) PHYS3851 PHYS4150 Computational physics (6)

Data analysis and modeling in physics (6) **PHYS4151** Advanced classical mechanics (6) **PHYS4350** Advanced quantum mechanics (6) PHYS4351 PHYS4450 Advanced electromagnetism (6) Advanced statistical mechanics (6) PHYS4550 PHYS4551 Solid state physics (6) General relativity (6) **PHYS4654** Experimental physics (6) PHYS4750 PHYS4850 Particle physics (6) PHYS7350 Graduate classical mechanics (6) Graduate quantum mechanics (6) PHYS7351 **PHYS7450** Graduate electromagnetism (6) Graduate statistical mechanics (6) PHYS7550 PHYS7551 Graduate solid state physics (6) Nanophysics (6) PHYS7750 3. Capstone requirement (6 credits) At least 6 credits selected from the following courses: Directed studies in physics (6) PHYS3999 **PHYS4966** Physics internship (6) PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks:

Major Title Major in Astronomy

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
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- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

## Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2265 Modern physics (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

#### **Disciplinary Electives (24 credits)**

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6) PHYS4652 Planetary science (6)

PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)

PHYS3850 Waves and optics (6)
PHYS3851 Atomic and nuclear physics (6)
PHYS4150 Computational physics (6)

Data analysis and modeling in physics (6) **PHYS4151** Advanced classical mechanics (6) **PHYS4350** Advanced quantum mechanics (6) PHYS4351 PHYS4450 Advanced electromagnetism (6) Advanced statistical mechanics (6) PHYS4550 PHYS4551 Solid state physics (6) General relativity (6) **PHYS4654** Experimental physics (6) PHYS4750 PHYS4850 Particle physics (6) PHYS7350 Graduate classical mechanics (6) Graduate quantum mechanics (6) PHYS7351 **PHYS7450** Graduate electromagnetism (6) Graduate statistical mechanics (6) PHYS7550 PHYS7551 Graduate solid state physics (6) Nanophysics (6) PHYS7750 3. Capstone requirement (6 credits) At least 6 credits selected from the following courses: Directed studies in physics (6) PHYS3999 **PHYS4966** Physics internship (6) PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks:

Major Title Major in Biochemistry

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
- PLO 2: apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown (by means of laboratorybased and research project-based learning)
- PLO 3: interpret and communicate scientific data and literature using appropriate scientific language (by means of literaturebased coursework and debate)
- PLO 4: work effectively as a team and synergize with their colleagues in a supportive manner (by means of group-based learning and by group-based problem solving)
- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

#### Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) **SCNC1111** Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (24 credits)** 

General chemistry I (6) CHEM1042 CHEM1043 General chemistry II (6) Basic biochemistry (6) BIOC2600

BIOL2220 Principles of biochemistry (6)

Organic chemistry I (6) CHEM2441

**Disciplinary Electives (6 credits)** 

Perspectives in biochemistry (6) **BIOC1600** 

BIOL1110 From molecules to cells (6)

Take either BIOC1600 or BIOI 1110 to fulfill this 6 credits requirement, but not both. Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both.

Take either BIOC2600 or BIOL2220 to fulfill

Take either BIOC2600 or BIOL2220 to fulfill

this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive

exclusive

## 2. Advanced level courses (48 credits)

## **Disciplinary Core Courses (30 credits)**

Basic metabolism (6) BIOC3601

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) Advanced biochemistry (6) BIOC4610

**BIOC4613** Advanced techniques in biochemistry & molecular biology (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6) BIOC3606 Molecular medicine (6) Nutritional biochemistry (6) BIOL3202 BIOL3402 Cell biology and cell technology (6) Immunology (6) BIOL3403

Protein structure and function (6) BIOL3404

BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6) BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)
CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOC3999 Directed studies in biochemistry (6)
BIOC4966 Biochemistry internship (6)
BIOC4999 Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Major Title Major in Biochemistry

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
- PLO 2: apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown (by means of laboratory-based and research project-based learning)
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- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

#### Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
BIOC2600 Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

CHEM2441 Organic chemistry I (6)

**Disciplinary Electives (6 credits)** 

BIOC1600 Perspectives in biochemistry (6)

BIOL1110 From molecules to cells (6)

Take either BIOC2600 or BIOL2220 to fulfill this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive.

Take either BIOC2600 or BIOL2220 to fulfill this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually exclusive

Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both. Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both.

## 2. Advanced level courses (48 credits)

## Disciplinary Core Courses (30 credits)

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) BIOC4610 Advanced biochemistry (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6)

BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)
CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOC3999 Directed studies in biochemistry (6)
BIOC4966 Biochemistry internship (6)
BIOC4999 Biochemistry project (12)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Major Title Major in Biochemistry

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
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- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

#### Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
BIOC2600 Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

CHEM2441 Organic chemistry I (6)

Disciplinary Electives (6 credits)

BIOC1600 Perspectives in biochemistry (6)

BIOL1110 From molecules to cells (6)

Take either BIOC2600 or BIOL2220 to fulfill this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

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Take either BIOC1600 or BIOI 1110 to fulfill

Take either BIOC1600 or BIOL1110 to fulfill

this 6 credits requirement, but not both.

this 6 credits requirement, but not both.

2. Advanced level courses (48 credits)

**Disciplinary Core Courses (30 credits)** 

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) BIOC4610 Advanced biochemistry (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6)

BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)
CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOC3999 Directed studies in biochemistry (6)
BIOC4966 Biochemistry internship (6)
BIOC4999 Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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#### Remarks

Major Title Major in Biochemistry

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
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#### Impermissible Combinations:

Minor in Biochemistry

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) **SCNC1111** SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

Perspectives in biochemistry (6) BIOC1600 BIOL1110 From molecules to cells (6) General chemistry I (6) CHEM1042 BIOC2600 Basic biochemistry (6) Organic chemistry I (6) CHEM2441

**Disciplinary Electives (6 credits)** 

General chemistry II (6) CHEM1043

CHEM2541 Introductory physical chemistry (6)

Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both. Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both.

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (30 credits)**

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

Molecular biology (6) BIOL3401 Advanced biochemistry (6) BIOC4610

Advanced techniques in biochemistry & molecular biology (6) **BIOC4613** 

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6) BIOC3606 Molecular medicine (6) Nutritional biochemistry (6) BIOL3202 BIOL3402 Cell biology and cell technology (6)

**BIOL3403** Immunology (6)

BIOL3404 Genetics (6) BIOL3408

Protein structure and function (6)

Organic chemistry II (6) CHEM3441 BIOC4612 Molecular biology of the gene (6) 'Omics' and systems biology (6) BIOL4417 Medicinal chemistry (6) CHEM4145

CHEM4444 Chemical biology (6) 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOC3999	Directed studies in biochemistry (6)
BIOC4966	Biochemistry internship (6)
BIOC4999	Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Major Title Major in Biochemistry

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

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## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
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- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
CHEM1042 General chemistry I (6)
BIOC2600 Basic biochemistry (6)
CHEM2441 Organic chemistry I (6)

Disciplinary Electives (6 credits)

CHEM1043 General chemistry II (6)

CHEM2541 Introductory physical chemistry (6)

Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both. Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both.

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (30 credits)**

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) BIOC4610 Advanced biochemistry (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)
CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6)
BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)
CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOC3999	Directed studies in biochemistry (6)
BIOC4966	Biochemistry internship (6)
BIOC4999	Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Major Title Major in Biochemistry

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
- PLO 2: apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown (by means of laboratory-based and research project-based learning)
- PLO 3: interpret and communicate scientific data and literature using appropriate scientific language (by means of literature-based coursework and debate)
- PLO 4: work effectively as a team and synergize with their colleagues in a supportive manner (by means of group-based learning and by group-based problem solving)
- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (30 credits)

BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
CHEM1042 General chemistry I (6)
BIOC2600 Basic biochemistry (6)
CHEM2441 Organic chemistry I (6)

Disciplinary Electives (6 credits)

CHEM1043 General chemistry II (6)

CHEM2541 Introductory physical chemistry (6)

Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both. Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both.

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (30 credits)**

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) BIOC4610 Advanced biochemistry (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6) CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6)
BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)

CHEM4444 Chemical biology (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOC3999	Directed studies in biochemistry (6)
BIOC4966	Biochemistry internship (6)
BIOC4999	Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Major Title Major in Biological Sciences

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology) and will undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

NIL

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

#### **Disciplinary Core Courses (36 credits)**

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)
BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

BIOL2306 Ecology and evolution (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both.

BIOL2220 and BIOC2600 are mutually

exclusive.

## 2. Advanced level courses (at least 42 credits)

#### **Disciplinary Electives (42 credits)**

#### (A) Genetics, molecular and cell biology (at least 12 credits selected from area A)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6) BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

## (B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6)

BIOL3303 Conservation biology (6)

BIOL3419 Insect ecology: the little things that run the world (6)

BIOL3501 Evolution (6)

## (C) Physiology and organismic biology (at least 18 credits with 6 credits from each of List I, II & III)

List I

BIOL3105 Animal physiology and environmental adaptation (6) BIOL3205 Human physiology (6)

BIOL3403 Immunology (6)

BIOL3406 Reproduction and reproductive biotechnology (6)
BIOL3503 Endocrinology: human physiology II (6)

List II

BIOL3107 Plant physiology (6)

BIOL3314 Plant structure and evolution (6) BIOL4411 Plant and food biotechnology (6)

List III

BIOL3109 Environmental microbiology (6)

BIOL3203 Food microbiology (6)

BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)
BIOL4964 Biological sciences internship (6)
BIOL4994 Biological sciences project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology) and will undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

#### **Disciplinary Core Courses (36 credits)**

From molecules to cells (6) BIOL1110 Evolutionary diversity (6) BIOL1309 Biostatistics (6)

BIOL2102

Biological sciences laboratory course (6) BIOL2103

BIOL2220 Principles of biochemistry (6)

Take either BIOI 2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Ecology and evolution (6) BIOL2306

**BIOC2600** Basic biochemistry (6) Take either BIOL2220 or BIOC2600 to fulfill

this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

#### 2. Advanced level courses (at least 42 credits)

#### **Disciplinary Electives (42 credits)**

#### (A) Genetics, molecular and cell biology (at least 12 credits selected from area A)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6) BIOL3404 Protein structure and function (6)

Genetics (6) **BIOL3408** 

## (B) Ecology, systematics and evolution (at least 12 credits selected from area B)

Marine biology (6) BIOL3301

Systematics and phylogenetics (6) BIOL3302

Conservation biology (6) BIOL3303

BIOL3419 Insect ecology: the little things that run the world (6)

BIOL3501 Evolution (6)

## (C) Physiology and organismic biology (at least 18 credits with 6 credits from each of List I, II & III)

List I

BIOL3105 Animal physiology and environmental adaptation (6) Human physiology (6) **BIOL3205** 

Reproduction and reproductive biotechnology (6) BIOL3406

Endocrinology: human physiology II (6) BIOL3503

Immunology (6)

List II

BIOL3403

BIOL3107 Plant physiology (6) BIOL3314 Plant structure and evolution (6) BIOL4411 Plant and food biotechnology (6)

List III

BIOL3109 Environmental microbiology (6)

BIOL3203 Food microbiology (6)

BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)
BIOL4964 Biological sciences internship (6)
BIOL4994 Biological sciences project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further allowed to specialize in areas such as microbiology, genetics & cytology, physiology & homeostasis, or diversity of life & environmental biology and undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in cell biology and genetics, physiology and systems biology, diversity of life and environmental biology, and applied biology (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

From molecules to cells (6) BIOL1110 Evolutionary diversity (6) BIOL1309 Biostatistics (6)

BIOL2102

Biological sciences laboratory course (6) BIOL2103

BIOL2220 Principles of biochemistry (6)

Take either BIOI 2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Ecology and evolution (6) BIOL2306 **BIOC2600** Basic biochemistry (6)

Take either BIOL2220 and BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

# 2. Advanced level courses (at least 42 credits)

#### **Disciplinary Electives (42 credits)**

Students must select at least 6 credits from each of the following area A, B, C & D:

(A) Genetics and cell biology

Molecular biology (6) BIOL3401

BIOL3402 Cell biology and cell technology (6)

Immunology (6) **BIOL3403** BIOL3408 Genetics (6)

(B) Physiology and systems biology

BIOL3105 Animal physiology and environmental adaptation (6)

**BIOL3107** Plant physiology (6) **BIOL3108** Microbial physiology (6)

Take either BIOL3108 or BIOL3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

**BIOL3205** Human physiology (6)

**BIOL3508** Microbial physiology and biotechnology (6)

Take either BIOL3108 or BIOL3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

## (C) Diversity of life and environmental biology

BIOL3109 Environmental microbiology (6) BIOL3110 Environmental toxicology (6)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6)

(D) Applied biology

BIOL3303 Conservation biology (6)

BIOL3409 Business aspects of biotechnology (6)

BIOL4301 Fish and fisheries (6)

BIOL4401 Medical microbiology and applied immunology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)
BIOL4964 Biological sciences internship (6)
BIOL4994 Biological sciences project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further allowed to specialize in areas such as microbiology, genetics & cytology, physiology & homeostasis, or diversity of life & environmental biology and undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in cell biology and genetics, physiology and systems biology, diversity of life and environmental biology, and applied biology (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

#### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

From molecules to cells (6) BIOL1110 Introductory microbiology (6) **BIOL1111** Evolutionary diversity (6) BIOL1309 Biostatistics (6) BIOL2102

BIOL2103 Biological sciences laboratory course (6)

**BIOL2306** Ecology and evolution (6)

# 2. Advanced level courses (at least 42 credits)

# **Disciplinary Electives (42 credits)**

Students must select at least 6 credits from each of the following area A, B, C & D:

### (A) Genetics and cell biology

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

Immunology (6) BIOL3403 BIOL3408 Genetics (6)

(B) Physiology and systems biology **BIOL3105** Animal physiology and environmental adaptation (6)

Plant physiology (6) **BIOL3107** 

Microbial physiology (6) **BIOL3108** 

Take either BIOI 3108 or BIOI 3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

BIOL3205 Human physiology (6)

Microbial physiology and biotechnology (6) BIOL3508

Take either BIOL3108 or BIOL3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive

# (C) Diversity of life and environmental biology

Environmental microbiology (6) **BIOL3109** BIOL3110 Environmental toxicology (6)

Marine biology (6) BIOL3301

Systematics and phylogenetics (6) BIOL3302

(D) Applied biology

Conservation biology (6) BIOL3303

**BIOL3409** Business aspects of biotechnology (6)

BIOL4301 Fish and fisheries (6) BIOL4401 Medical microbiology and applied immunology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)

BIOL4964 Biological sciences internship (6) BIOL4994 Biological sciences project (12)

#### Notes:

1. BIOL1111 Introductory Microbiology is not offered from 2015-16. Students should take either BIOL2220 Principles of biochemistry or BIOC2600 Basic biochemistry as a replacement, both BIOL2220 and BIOC2600 are mutually exclusive.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further allowed to specialize in areas such as microbiology, genetics & cytology, physiology & homeostasis, or diversity of life & environmental biology and undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in cell biology and genetics, physiology and systems biology, diversity of life and environmental biology, and applied biology (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

#### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

From molecules to cells (6) BIOL1110 Introductory microbiology (6) **BIOL1111** Evolutionary diversity (6) BIOL1309 Biostatistics (6) BIOL2102

BIOL2103 Biological sciences laboratory course (6)

**BIOL2306** Ecology and evolution (6)

# 2. Advanced level courses (at least 42 credits)

# **Disciplinary Electives (42 credits)**

Students must select at least 6 credits from each of the following area A, B, C & D:

### (A) Genetics and cell biology

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6) Genetics (6) BIOL3408 (B) Physiology and systems biology

**BIOL3105** Animal physiology and environmental adaptation (6)

**BIOL3107** Plant physiology (6)

Microbial physiology (6) **BIOL3108** 

BIOL3205 Human physiology (6)

Microbial physiology and biotechnology (6) BIOL3508

exclusive. Take either BIOL3108 or BIOL3508 to fulfill

Take either BIOI 3108 or BIOI 3508 to fulfill

this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually

this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive

# (C) Diversity of life and environmental biology

Environmental microbiology (6) **BIOL3109** BIOL3110 Environmental toxicology (6) Marine biology (6) BIOL3301

Systematics and phylogenetics (6) BIOL3302

(D) Applied biology

Conservation biology (6) BIOL3303

**BIOL3409** Business aspects of biotechnology (6)

Fish and fisheries (6) BIOL4301

BIOL4401 Medical microbiology and applied immunology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)

BIOL4964 Biological sciences internship (6) BIOL4994 Biological sciences project (12)

#### Notes:

- 1. BIOL1111 Introductory Microbiology is not offered from 2015-16. Students should take either BIOL2220 Principles of biochemistry or BIOC2600 Basic biochemistry as a replacement, both BIOL2220 and BIOC2600 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further allowed to specialize in areas such as microbiology, genetics & cytology, physiology & homeostasis, or diversity of life & environmental biology and undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

## Learning Outcomes:

By the end of this programme, students should be able to:

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- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
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- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

#### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

From molecules to cells (6) BIOL1110 Introductory microbiology (6) **BIOL1111** Evolutionary diversity (6) BIOL1309

Biostatistics (6) BIOL2102

BIOL2103 Biological sciences laboratory course (6)

**BIOL2306** Ecology and evolution (6)

# 2. Advanced level courses (at least 42 credits)

# **Disciplinary Electives (42 credits)**

Students must select at least 6 credits from each of the following area A, B, C & D:

### (A) Genetics and cell biology

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

Immunology (6) BIOL3403 BIOL3408 Genetics (6) (B) Physiology and systems biology

**BIOL3105** Animal physiology and environmental adaptation (6)

**BIOL3107** Plant physiology (6)

Microbial physiology (6) **BIOL3108** 

Take either BIOI 3108 or BIOI 3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

BIOL3205 Human physiology (6)

Microbial physiology and biotechnology (6) BIOL3508

Take either BIOL3108 or BIOL3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive

# (C) Diversity of life and environmental biology

Environmental microbiology (6) **BIOL3109** BIOL3110 Environmental toxicology (6)

Marine biology (6) BIOL3301

Systematics and phylogenetics (6) BIOL3302

(D) Applied biology

Conservation biology (6) BIOL3303

**BIOL3409** Business aspects of biotechnology (6)

Fish and fisheries (6) BIOL4301

BIOL4401 Medical microbiology and applied immunology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)

BIOL4964 Biological sciences internship (6) BIOL4994 Biological sciences project (12)

#### Notes:

- 1. BIOL1111 Introductory Microbiology is not offered from 2015-16. Students should take either BIOL2220 Principles of biochemistry or BIOC2600 Basic biochemistry as a replacement, both BIOL2220 and BIOC2600 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details

#### Remarks:

Major Title Major in Chemistry

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

# Impermissible Combinations:

Minor in Chemistry

List A

# Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)
SCNC1111 Scientific method and reasoning (6)
SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
CHEM2241 Analytical chemistry I (6)
CHEM2341 Inorganic chemistry I (6)
CHEM2441 Organic chemistry I (6)

CHEM2541 Introductory physical chemistry (6)

### 2. Advanced level courses (42 credits)

## **Disciplinary Core Course (30 credits)**

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3441 Organic chemistry II (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits of any level 4 Chemistry (CHEM4XXX) courses. The current list include courses in List A.

CHEM4142 Symmetry, group theory and applications (6)
CHEM4143 Interfacial science and technology (6)
CHEM4144 Advanced materials (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4341 Advanced inorganic chemistry (6)

CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia

(6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Major Title Major in Chemistry

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

# Impermissible Combinations:

Minor in Chemistry

List A

# Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)
SCNC1111 Scientific method and reasoning (6)
SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
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CHEM2441 Organic chemistry I (6)
CHEM2541 Introductory physical chemistry (6)

2. Advanced level courses (42 credits)

Disciplinary Core Course (30 credits)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3441 Organic chemistry II (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits of any level 4 Chemistry (CHEM4XXX) courses. The current list include courses in List A.

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CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)

CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia

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#### Notes:

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- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Major Title Major in Chemistry

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

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# Impermissible Combinations:

Minor in Chemistry

List A

# Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)
SCNC1111 Scientific method and reasoning (6)
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**Disciplinary Core Courses (36 credits)** 

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
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CHEM2441 Organic chemistry I (6)

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### 2. Advanced level courses (42 credits)

## **Disciplinary Core Course (30 credits)**

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3441 Organic chemistry II (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits of any level 4 Chemistry (CHEM4XXX) courses. The current list include courses in List A.

CHEM4142 Symmetry, group theory and applications (6)
CHEM4143 Interfacial science and technology (6)
CHEM4144 Advanced materials (6)

CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)
CHEM4241 Modern chemical instrumentation

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4341 Advanced inorganic chemistry (6)

CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia

(6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Major Title Major in Chemistry

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

# Impermissible Combinations:

Minor in Chemistry

# Required courses (96 credits)

1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

CHEM1042 General chemistry I (6) [previous title: General chemistry (6) ]

CHEM2241 Analytical chemistry I (6)
CHEM2341 Inorganic chemistry I (6)
CHEM2441 Organic chemistry I (6)

CHEM2541 Introductory physical chemistry (6) [previous title: Physical chemistry I (6)]

2. Advanced level courses (48 credits)

**Disciplinary Core Course (30 credits)** 

CHEM3146 Principles and applications of spectroscopic

and analytical techniques (6)
Analytical chemistry II: chemical instrumentation (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3441 Organic chemistry II (6)

CHEM3541 Physical chemistry: Introduction to quantum [previous title: Physical chemistry II: Introduction to

chemistry (6) quantum chemistry (6) 1

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following 18 credits of courses in two different areas in List A:

List A

CHEM3241

CHEM3542 Physical chemistry: statistical

thermodynamics and kinetics theory (6)
CHEM4341 Advanced inorganic chemistry (6)
CHEM4441 Advanced organic chemistry (6)

dvanced organic chemistry (6) Take either CHEM4443 or CHEM4441 to fulfill this 12

credits requirement, but not both.

CHEM4443 Integrated organic synthesis (6) Take either CHEM4443 or CHEM4441 to fulfill this 12

credits requirement, but not both.

#### **Disciplinary Electives (6 credits)**

At least 6 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level, excluding CHEM3999 Directed studies in chemistry, CHEM4910 Chemistry literacy and research, CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia, CHEM4966 Chemistry internship and CHEM4999 Chemistry project), subject to pre-requisite requirements. The current list inlcude courses in List B and those course not selected to fulfill the requirements in List A.

List B

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) CHEM3143 Introduction to materials chemistry (6)

CHEM3242 Food and water analysis (6) CHEM3342 Bioinorganic chemistry (6)

CHEM3442 Organic chemistry of biomolecules (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3443 Organic chemistry laboratory (6)
CHEM3445 Integrated laboratory (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)
CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)

CHEM4910 Chemistry literacy and research (6)
CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

## Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 6. CHEM3146 Principles and applications of spectroscopic and analytical techniques is not offered from 2016-17. Students should consult the course selection advisers for course replacement.

# Remarks:

Major Title Major in Chemistry

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratorybased and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research

# Impermissible Combinations:

Minor in Chemistry

# Required courses (96 credits)

1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (30 credits)** 

General chemistry I (6) CHEM1042 I previous title: General chemistry (6) 1

CHEM2241 Analytical chemistry I (6) Inorganic chemistry I (6) CHEM2341 CHEM2441 Organic chemistry I (6)

CHEM2541 Introductory physical chemistry (6) [ previous title: Physical chemistry I (6) ]

2. Advanced level courses (48 credits) **Disciplinary Core Courses (30 credits)** 

Principles and applications of spectroscopic CHEM3146 and analytical techniques (6)

Analytical chemistry II: chemical CHEM3241 instrumentation (6) Inorganic chemistry II (6)

CHEM3341 Organic chemistry II (6) CHFM3441

CHEM3541 Physical chemistry: Introduction to quantum [ previous title: Physical chemistry II: Introduction to

chemistry (6) quantum chemistry (6) ]

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following 18 credits of courses in two different areas in List A:

List A

CHEM4541

CHEM3542 Physical chemistry: statistical thermodynamics and kinetics theory (6) CHEM4341 Advanced inorganic chemistry (6)

credits requirement, but not both.

Advanced organic chemistry (6) Take either CHEM4443 or CHEM4441 to fulfill this 12 CHEM4441 credits requirement, but not both.

Physical chemistry III: statistical

thermodynamics and kinetics theory (6)

Take either CHEM4443 or CHEM4441 to fulfill this 12

Take either CHEM3542 or CHEM4541 to fulfill this 12

Integrated organic synthesis (6) CHEM4443 credits requirement, but not both.

Take either CHEM3542 or CHEM4541 to fulfill this 12

credits requirement, but not both.

**Disciplinary Electives (6 credits)** 

At least 6 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level, excluding CHEM3999 Directed studies in chemistry, CHEM4910 Chemistry literacy and research, CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia, CHEM4966 Chemistry internship and CHEM4999 Chemistry project), subject to pre-requisite requirements. The current list inlcude courses in List B and those courses not selected to fulfill the requirements in List A.

List B

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) CHEM3143 Introduction to materials chemistry (6)

CHEM3242 Food and water analysis (6) CHEM3342 Bioinorganic chemistry (6)

CHEM3442 Organic chemistry of biomolecules (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)
CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999

CHEM4910

Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)

CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

## Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 6. CHEM3146 Principles and applications of spectroscopic and analytical techniques is not offered from 2016-17. Students should consult the course selection advisers for course replacement.

# Remarks:

Major Title Major in Chemistry

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratorybased and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research

# Impermissible Combinations:

Minor in Chemistry

# Required courses (96 credits)

1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (30 credits)** 

General chemistry I (6) CHEM1042 I previous title: General chemistry (6) 1

CHEM2241 Analytical chemistry I (6) Inorganic chemistry I (6) CHEM2341 CHEM2441 Organic chemistry I (6)

CHEM2541 Introductory physical chemistry (6) [ previous title: Physical chemistry I (6) ]

2. Advanced level courses (48 credits) **Disciplinary Core Courses (30 credits)** 

Principles and applications of spectroscopic CHEM3146 and analytical techniques (6)

Analytical chemistry II: chemical instrumentation (6) Inorganic chemistry II (6)

Organic chemistry II (6) CHFM3441 CHEM3541 Physical chemistry: Introduction to quantum

[ previous title: Physical chemistry II: Introduction to

chemistry (6) quantum chemistry (6) ]

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following 18 credits of courses in two different areas in List A:

List A

CHEM3241

CHEM3341

Take either CHEM3542 or CHEM4541 to fulfill this 12 CHEM3542 Physical chemistry: statistical thermodynamics and kinetics theory (6) credits requirement, but not both. CHEM4341 Advanced inorganic chemistry (6) Advanced organic chemistry (6) CHEM4441

Take either CHEM4443 or CHEM4441 to fulfill this 12

credits requirement, but not both.

Take either CHEM4443 or CHEM4441 to fulfill this 12 Integrated organic synthesis (6) CHEM4443

credits requirement, but not both.

Take either CHEM3542 or CHEM4541 to fulfill this 12 Physical chemistry III: statistical CHEM4541

credits requirement, but not both. thermodynamics and kinetics theory (6)

**Disciplinary Electives (6 credits)** 

At least 6 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level, excluding CHEM3999 Directed studies in chemistry, CHEM4910 Chemistry literacy and research, CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia, CHEM4966 Chemistry internship and CHEM4999 Chemistry project), subject to pre-requisite requirements. The current list inlcude courses in List B and those courses not selected to fulfill the requirements in List A.

List B

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) CHEM3143 Introduction to materials chemistry (6)

CHEM3242 Food and water analysis (6) CHEM3342 Bioinorganic chemistry (6)

CHEM3442 Organic chemistry of biomolecules (6) CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)
CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999

CHEM4910

Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

## Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 6. CHEM3146 Principles and applications of spectroscopic and analytical techniques is not offered from 2016-17. Students should consult the course selection advisers for course replacement.

# Remarks:

Major Title Major in Decision Analytics

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: identify and adopt appropriate analytical techniques and tools to extract and classify critical information from structured or unstructured data (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: be proficient with the design and implementation of advanced modelling techniques and database management, and offer effective recommendations for analytic initiatives and solutions (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: evaluate the quality of information from different sources in support of critical decision making, process streamlining and the optimization of resources, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate to people effectively and efficiently with professionalism and accuracy using interactive and dynamic tools to translate technical information and present collaborative and strategic ideas (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in decision analytics and confidence to solve real-life problems through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

COMP1117 Computer programming (6)

COMP2119 Introduction to data structures and algorithms (6)

MATH1013 University mathematics II (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (42 credits)

# Disciplinary Core Courses (30 credits)

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6)
STAT3600 Linear statistical analysis (6)
STAT3612 Data mining (6)
STAT4609 Big data analytics (6)

## **Disciplinary Electives (12 credits)**

# At least 12 credits selected from the following courses:

COMP3250 Design and analysis of algorithms (6)

COMP3270 Artificial intelligence (6)
COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)
MATH3408 Computational methods and differential equations with

applications (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)
STAT3616 Advanced SAS programming (6)

Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621

Data visualization (6) STAT3622 STAT4601 Time-series analysis (6) STAT4602 Multivariate data analysis (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: Directed studies in statistics (6) STAT3799

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) Statistics project (12) STAT4799

#### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

a. Biomedical Analytics

BIOL4417 'Omics' and systems biology STAT3607 Statistics in clinical medicine and bio-medical research

STAT3608 Statistical genetics

STAT3620 Modern nonparametric statistics

STAT3621 Statistical data analysis

STAT4602 Multivariate data analysis

b. Financial and Risk Analytics

STAT3616 Advanced SAS programming

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Major Title Major in Decision Analytics

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: identify and adopt appropriate analytical techniques and tools to extract and classify critical information from structured or unstructured data (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: be proficient with the design and implementation of advanced modelling techniques and database management, and offer effective recommendations for analytic initiatives and solutions (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: evaluate the quality of information from different sources in support of critical decision making, process streamlining and the optimization of resources, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate to people effectively and efficiently with professionalism and accuracy using interactive and dynamic tools to translate technical information and present collaborative and strategic ideas (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in decision analytics and confidence to solve real-life problems through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

# Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

COMP1117 Computer programming (6)

COMP2119 Introduction to data structures and algorithms (6)

MATH1013 University mathematics II (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (42 credits)

# Disciplinary Core Courses (30 credits)

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6)
STAT3600 Linear statistical analysis (6)
STAT3612 Data mining (6)
STAT4609 Big data analytics (6)

## **Disciplinary Electives (12 credits)**

# At least 12 credits selected from the following courses:

COMP3250 Design and analysis of algorithms (6)

COMP3270 Artificial intelligence (6) COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)
MATH3408 Computational methods and differential equations with

applications (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)
STAT3616 Advanced SAS programming (6)

STAT3620 Modern nonparametric statistics (6) Statistical data analysis (6) STAT3621 Data visualization (6)

STAT3622 STAT4601 Time-series analysis (6) STAT4602 Multivariate data analysis (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: Directed studies in statistics (6) STAT3799

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) Statistics project (12) STAT4799

#### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

a. Biomedical Analytics

BIOL4417 'Omics' and systems biology STAT3607 Statistics in clinical medicine and bio-medical research

STAT3608 Statistical genetics

STAT3620 Modern nonparametric statistics

STAT3621 Statistical data analysis

STAT4602 Multivariate data analysis

b. Financial and Risk Analytics

STAT3616 Advanced SAS programming

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Major Title Major in Decision Analytics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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#### Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

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# 2. Advanced level courses (42 credits)

# Disciplinary Core Courses (30 credits)

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At least 12 credits selected from the following courses:

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COMP3270 Artificial intelligence (6)
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MATH3408 Computational methods and differential equations with

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MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
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STAT3620 Modern nonparametric statistics (6) Statistical data analysis (6) STAT3621 Data visualization (6) STAT3622 STAT4601 Time-series analysis (6) STAT4602

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: Directed studies in statistics (6) STAT3799

STAT4710 Capstone experience for statistics undergraduates (6)

Multivariate data analysis (6)

STAT4766 Statistics internship (6) Statistics project (12) STAT4799

#### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

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STAT3616 Advanced SAS programming

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Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Major Title Major in Decision Analytics

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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#### Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

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**Disciplinary Core Courses (36 credits)** 

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# 2. Advanced level courses (42 credits)

# Disciplinary Core Courses (30 credits)

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STAT3600 Linear statistical analysis (6)
STAT3612 Data mining (6)
STAT4609 Big data analytics (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

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COMP3270 Artificial intelligence (6)
COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)
MATH3408 Computational methods and differential equations with

applications (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)
STAT3616 Advanced SAS programming (6)

STAT3620 Modern nonparametric statistics (6) Statistical data analysis (6) STAT3621 Data visualization (6) STAT3622 STAT4601 Time-series analysis (6) Multivariate data analysis (6)

STAT4602 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

Directed studies in statistics (6) STAT3799

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) Statistics project (12) STAT4799

#### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

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STAT3608 Statistical genetics

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STAT4602 Multivariate data analysis

b. Financial and Risk Analytics

STAT3616 Advanced SAS programming

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

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Major Title Major in Decision Analytics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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- PLO 6: gain insights into current advances in decision analytics and confidence to solve real-life problems through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

COMP1117 Computer programming (6)

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STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (42 credits)

## Disciplinary Core Courses (30 credits)

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6)
STAT3600 Linear statistical analysis (6)
STAT3612 Data mining (6)

STAT4609 Big data analytics (6) **Disciplinary Electives (12 credits)** 

# At least 12 credits selected from the following courses:

COMP3250 Design and analysis of algorithms (6)

COMP3270 Artificial intelligence (6)
COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)
MATH3408 Computational methods and differential equations with

applications (6)

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Data visualization (6) STAT3622 STAT4601 Time-series analysis (6) STAT4602 Multivariate data analysis (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: Directed studies in statistics (6) STAT3799

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) Statistics project (12) STAT4799

#### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

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b. Financial and Risk Analytics

STAT3616 Advanced SAS programming

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

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Major Title Major in Decision Analytics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

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By the end of this programme, students should be able to:

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- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Major Title Major in Earth System Science

Offered to students 2017

admitted to Year 1 in

#### Objectives:

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, soil and water conservation and teaching.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

#### Minor in Earth Sciences Required courses (96 credits) 1. Introductory level courses (48 credits) **Disciplinary Core Courses: Science Foundation Courses (12 credits)** SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112 **Disciplinary Core Courses (36 credits)** Blue Planet (6) EASC1401 Introduction to the earth-life system (6) EASC1406 Fluid/solid interactions in earth processes (6) EASC2401 EASC2402 Field and laboratory methods (6) EASC2404 Introduction to atmosphere and hydrosphere (6) Data analysis and modeling in earth sciences (6) FASC2410 2. Advanced level courses (42 credits) **Disciplinary Core Courses (6 credits)**

EASC4403 Biogeochemical cycles (6)

## **Disciplinary Electives (36 credits)**

List A

At least 36 credits selected from Lists A and B, among which at least 18 credits from List A:

Earth sciences project (12)

EASC3410	Hydrogeology (6)
EASC3415	Meteorology (6)
EASC3418	Earth surface processes (6)
ENVS3313	Environmental oceanography (6)
List B	
EASC3020	Global change: anthropogenic impacts (6)
EASC3403	Sedimentary environments (6)
EASC3405	Environmental remote sensing (6)
EASC3406	Reconstruction of past climate (6)
EASC3412	Earth resources (6)

Earth through time (6) EASC3417 Directed studies in earth sciences (6) FASC3999 ENVS3007 Natural hazards and mitigation (6) EASC4408 Special topics in earth sciences (6)

3. Capstone requirement (6 credits)

EASC4999

EASC4911 Earth system: contemporary issues (6)

## Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.
- 6. Students are recommended to take PHYS1240 Physics by Inquiry and CHEM1041 Foundations of Chemistry if they do not have level 3 or above in HKDSE Physics and Chemistry, respectively, or equivalent.

#### Remarks

Major Title Major in Earth System Science

Offered to students 2016

admitted to Year 1 in

#### Objectives:

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, soil and water conservation and teaching.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

## Impermissible Combinations:

Minor in Earth Sciences

SCNC1112

# Required courses (96 credits)

### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1309 Evolutionary diversity (6)
EASC1401 Blue Planet (6)
EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

# 2. Advanced level courses (42 credits)

## Disciplinary Core Courses (6 credits)

EASC4403 Biogeochemical cycles (6)

## **Disciplinary Electives (36 credits)**

At least 36 credits selected from Lists A and B, among which at least 12 credits from List A:

Fundamentals of modern science (6)

List A

EASC3410 Hydrogeology (6) EASC3415 Meteorology (6)

ENVS3313 Environmental oceanography (6)

List B

EASC3403 Sedimentary environments (6)
EASC3405 Environmental remote sensing (6)
EASC3406 Reconstruction of past climate (6)

EASC3408 Geophysics (6) EASC3412 Earth resources (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4408 Special topics in earth sciences (6)
EASC4999 Earth sciences project (12)

### 3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

## Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

#### Remarks:

Major Title Major in Earth System Science

Offered to students 2015

admitted to Year 1 in

#### Objectives:

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, soil and water conservation and teaching.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

SCNC1112

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

**Disciplinary Core Courses: Science Foundation Courses (12 credits)** SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

Evolutionary diversity (6) **BIOI 1309** Blue Planet (6) EASC1401 Principles of geology (6) EASC1402

Fluid/solid interactions in earth processes (6) EASC2401

EASC2402 Field and laboratory methods (6)

Introduction to atmosphere and hydrosphere (6) FASC2404

# 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (6 credits)**

EASC4403 Biogeochemical cycles (6)

## **Disciplinary Electives (36 credits)**

At least 36 credits selected from Lists A and B, among which at least 12 credits from List A:

List A

EASC3410 Hydrogeology (6) Meteorology (6) EASC3415

ENVS3313 Environmental oceanography (6)

List B

EASC3403 Sedimentary environments (6) EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) EASC3406

EASC3408 Geophysics (6) Earth resources (6) EASC3412

Advanced geochemistry and geochronology (6) EASC3416

Earth through time (6) EASC3417

Directed studies in earth sciences (6) FASC3999 ENVS3007 Natural hazards and mitigation (6) EASC4408 Special topics in earth sciences (6) Earth sciences project (12) EASC4999

# 3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

## Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

#### Remarks:

Major Title Major in Earth System Science

Offered to students 2014

admitted to Year 1 in

### Objectives:

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, soil and water conservation and teaching.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

### Impermissible Combinations:

Minor in Earth Sciences

# Required courses (96 credits) 1. Introductory level courses (48 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6) Disciplinary Core Courses (36 credits) BIOL1309 Evolutionary diversity (6)

EASC1401 Blue Planet (6)
EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

# 2. Advanced level courses (42 credits) Disciplinary Core Courses (6 credits)

EASC4403 Biogeochemical cycles (6)

# Disciplinary Electives (36 credits)

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A
EASC3410 Hydrogeology (6)
EASC3415 Meteorology (6)

ENVS3313 Environmental oceanography (6)

List B

EASC3403 Sedimentary environments (6)
EASC3405 Environmental remote sensing (6)
EASC3406 Reconstruction of past climate (6)

EASC3408 Geophysics (6) EASC3412 Earth resources (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4408 Special topics in earth sciences (6)
EASC4999 Earth sciences project (12)

### 3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

### Remarks:

Major Title Major in Earth System Science

Offered to students 2013

admitted to Year 1 in

### Objectives:

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, soil and water conservation and teaching.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

### Impermissible Combinations:

Minor in Earth Sciences

SCNC1112

### Required courses (96 credits) 1. Introductory level courses (48 credits) **Disciplinary Core Courses: Science Foundation Courses (12 credits)** SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

Evolutionary diversity (6) BIOL1309 Blue Planet (6) EASC1401 Principles of geology (6) EASC1402

Fluid/solid interactions in earth processes (6) EASC2401

EASC2402 Field and laboratory methods (6)

Introduction to atmosphere and hydrosphere (6) FASC2404

### 2. Advanced level courses (42 credits) **Disciplinary Core Courses (6 credits)**

EASC4403 Biogeochemical cycles (6)

# **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A EASC3410 Hydrogeology (6) Meteorology (6) EASC3415

ENVS3313 Environmental oceanography (6)

List B

EASC3403 Sedimentary environments (6) EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) EASC3406

EASC3408 Geophysics (6) Earth resources (6) EASC3412

Advanced geochemistry and geochronology (6) EASC3416

Earth through time (6) EASC3417

Directed studies in earth sciences (6) FASC3999 ENVS3007 Natural hazards and mitigation (6) EASC4408 Special topics in earth sciences (6) Earth sciences project (12) EASC4999

# 3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

### Remarks:

Major Title Major in Earth System Science

Offered to students 2012

admitted to Year 1 in

### Objectives:

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, soil and water conservation and teaching.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

### Impermissible Combinations:

### Minor in Earth Sciences Required courses (96 credits) 1. Introductory level courses (48 credits) **Disciplinary Core Courses: Science Foundation Courses (12 credits)** SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112 **Disciplinary Core Courses (36 credits)** Evolutionary diversity (6) BIOL1309 Blue Planet (6) EASC1401 EASC1402 Principles of geology (6) Fluid/solid interactions in earth processes (6) EASC2401 EASC2402 Field and laboratory methods (6) Introduction to atmosphere and hydrosphere (6) FASC2404

### 2. Advanced level courses (42 credits) **Disciplinary Core Courses (6 credits)**

EASC4403 Biogeochemical cycles (6)

# **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A: EASC3410 Hydrogeology (6) Meteorology (6) EASC3415 ENVS3313 Environmental oceanography (6) List B Sedimentary environments (6) EASC3403 EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) EASC3406 EASC3408 Geophysics (6) Earth resources (6) EASC3412 Advanced geochemistry and geochronology (6) EASC3416

Earth through time (6) EASC3417

Directed studies in earth sciences (6) FASC3999 ENVS3007 Natural hazards and mitigation (6) EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

### 3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

### Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2017

admitted to Year 1 in

### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

### Impermissible Combinations:

Minor in Ecology & Biodiversity

**BIOL3328** 

### Required courses (96 credits) 1. Introductory level courses (48 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits) Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6) **Disciplinary Core Courses (36 credits)** From molecules to cells (6) BIOL1110 Evolutionary diversity (6) BIOL1309 BIOL2102 Biostatistics (6) BIOL2103 Biological sciences laboratory course (6) Ecology and evolution (6) **BIOL2306** Environmental data analysis (6) ENVS2002 2. Advanced level courses (42 credits) **Disciplinary Core Courses (18 credits)** BIOL3301 Marine biology (6) Systematics and phylogenetics (6) BIOL3302 BIOL3319 Tropical terrestrial ecology (6) **Disciplinary Electives (24 credits)** At least 24 credits selected from the following courses: BIOL3101 Animal behaviour (6) Conservation biology (6) **BIOL3303** BIOL3305 Tropical and temperate marine ecology field course (6) Freshwater ecology (6) BIOL3313 Plant structure and evolution (6) BIOL3314 Experimental intertidal ecology (6) BIOL3318 Marine invertebrate zoology (6) BIOL3322

Nearshore marine and estuarine ecology (6)

BIOL3419	Insect ecology: the little things that run the world (6)
BIOL4301	Fish and fisheries (6)
BIOL4302	Environmental impact assessment (6)
BIOL4304	Ecosystem functioning and services (6)
BIOL4505	Oyster aquaculture: business and technology (6)
BIOL4861	Ecology & biodiversity internship (6)
ENVS3019	Urban ecology (6)
ENVS3020	Global change ecology (6)
3. Capstone requirement	ent (6 credits)
At least 6 credits sel	ected from the following courses:
BIOL3991	Directed studies in ecology & biodiversity (6)
BIOL4911	Conservation science in practice (6)

Ecology & biodiversity project (12)

### Notes:

BIOL4991

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2016

admitted to Year 1 in

### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

### Impermissible Combinations:

Minor in Ecology & Bio		
Required courses	s (96 credits)	
	el courses (48 credits) Courses: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	
SCNC1112	Fundamentals of modern science (6)	
Disciplinary Core	Courses (36 credits)	
BIOL1110	From molecules to cells (6)	
BIOL1309	Evolutionary diversity (6)	
BIOL2102	Biostatistics (6)	
BIOL2103	Biological sciences laboratory course (6)	
BIOL2306	Ecology and evolution (6)	
ENVS2002	Environmental data analysis (6)	
II .	courses (42 credits)	
	Courses (12 credits)	
BIOL3302	Systematics and phylogenetics (6)	
BIOL3303	Conservation biology (6)	[previous title: Conservation ecology (6) ]
Disciplinary Electi	,	
	ts selected from the following courses:	
BIOL3101	Animal behaviour (6)	
BIOL3109	Environmental microbiology (6)	
BIOL3301	Marine biology (6)	
BIOL3305	Tropical and temperate marine ecology field course (6)	
BIOL3313	Freshwater ecology (6)	
BIOL3314	Plant structure and evolution (6)	
BIOL3318	Experimental intertidal ecology (6)	
BIOL3319	Tropical terrestrial ecology (6)	[previous title: Terrestrail ecology (6) ]
BIOL3320	The biology of marine mammals (6)	

BIOL3322	Marine invertebrate zoology (6)	
BIOL3328	Nearshore marine and estuarine ecology (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL3505	Oyster aquaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4304	Ecosystem functioning and services (6)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	ement (6 credits)	
At least 6 credits	selected from the following courses:	
BIOL3991	Directed studies in ecology & biodiversity (6)	
BIOL4911	Conservation science in practice (6)	
BIOL4921	Animal behaviour and behavioural ecology: field course (6)	
BIOL4991	Ecology & biodiversity project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2015

admitted to Year 1 in

### **Objectives:**

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

### Impermissible Combinations:

Minor in Ecology & Biodiversity

# Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6) BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)
BIOL2103 Biological sciences laboration

BIOL2103 Biological sciences laboratory course (6)

BIOL2306 Ecology and evolution (6) ENVS2002 Environmental data analysis (6)

2. Advanced level courses (42 credits) Disciplinary Core Courses (12 credits)

BIOL3302 Systematics and phylogenetics (6)

BIOL3303 Conservation biology (6)

**Disciplinary Electives (30 credits)** 

At least 30 credits selected from the following courses:

BIOL3101 Animal behaviour (6)

Take either BIOL3101 or BIOL4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.

Iprevious title: Conservation ecology (6) 1

BIOL3109 Environmental microbiology (6)

BIOL3301 Marine biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3313 Freshwater ecology (6)
BIOL3314 Plant structure and evolution (6)

BIOL3318 BIOL3319 BIOL3320 BIOL3322 BIOL3328 BIOL3419	Experimental intertidal ecology (6) Tropical terrestrial ecology (6) The biology of marine mammals (6) Marine invertebrate zoology (6) Nearshore marine and estuarine ecology (6) Insect ecology: the little things that run the world (6)	[previous title: Terrestrail ecology (6) ]
BIOL3505	Oyster aquaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL4304	Ecosystem functioning and services (6)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	oxolden or
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	rement (6 credits)	
	s selected from the following courses:	
BIOL3951	Ecology & biodiversity field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL3991	Directed studies in ecology & biodiversity (6)	
BIOL4911	Conservation science in practice (6)	
BIOL4921	Animal behaviour and behavioural ecology: field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL4991	Ecology & biodiversity project (12)	•

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Ecology & Biodiversity

2014

Offered to students

admitted to Year 1 in

### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

### Impermissible Combinations:

Minor in Ecology & Biodiversity

# Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

From molecules to cells (6) BIOL1110 Evolutionary diversity (6) BIOL1309

BIOL2102 Biostatistics (6) BIOL2103

Biological sciences laboratory course (6)

Ecology and evolution (6) **BIOL2306** Environmental data analysis (6) ENVS2002

2. Advanced level courses (42 credits) **Disciplinary Core Courses (12 credits)** 

BIOL3302 Systematics and phylogenetics (6)

Conservation biology (6) BIOL3303

Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:

BIOL3101 Animal behaviour (6)

Take either BIOI 3101 or BIOI 4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.

Iprevious title: Conservation ecology (6) 1

BIOL3109 Environmental microbiology (6)

BIOL3301 Marine biology (6)

Tropical and temperate marine ecology field course (6) BIOL3305

BIOL3313 Freshwater ecology (6) Plant structure and evolution (6) **BIOL3314** 

BIOL3318 BIOL3319 BIOL3320 BIOL3322 BIOL3328 BIOL3419	Experimental intertidal ecology (6) Tropical terrestrial ecology (6) The biology of marine mammals (6) Marine invertebrate zoology (6) Nearshore marine and estuarine ecology (6) Insect ecology: the little things that run the world (6)	[previous title: Terrestrial ecology (6) ]
BIOL3505	Oyster aquaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL4304	Ecosystem functioning and services (6)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	<b>5</b> , , ,	
	s selected from the following courses:	
BIOL3951	Ecology & biodiversity field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL3991	Directed studies in ecology & biodiversity (6)	2.02.027 dio matadily oxoladivo.
BIOL4911	Conservation science in practice (6)	
BIOL4921	Animal behaviour and behavioural ecology: field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL4991	Ecology & biodiversity project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Ecology & Biodiversity

2013

Offered to students

admitted to Year 1 in

### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

### Impermissible Combinations:

Minor in Ecology & Biodiversity

Required	l courses	(96	credits)
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1. Ir	itroauc	ctory	ievei co	ourses (4	8 creaits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (36 credits)** 

From molecules to cells (6) BIOL1110 Evolutionary diversity (6) BIOL1309

BIOL2102 Biostatistics (6) **BIOI 2103** 

Biological sciences laboratory course (6)

Ecology and evolution (6) **BIOL2306** Environmental data analysis (6) ENVS2002

2. Advanced level courses (42 credits) **Disciplinary Core Courses (12 credits)** 

Systematics and phylogenetics (6) BIOL3302

Conservation biology (6) BIOL3303

Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:

BIOL3101 Animal behaviour (6)

Take either BIOI 3101 or BIOI 4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.

Iprevious title: Conservation ecology (6) 1

BIOL3109 Environmental microbiology (6)

BIOL3301 Marine biology (6)

Tropical and temperate marine ecology field course (6) BIOL3305

BIOL3313 Freshwater ecology (6) Plant structure and evolution (6) **BIOL3314** 

BIOL3318 BIOL3319 BIOL3320 BIOL3322 BIOL3328 BIOL3419	Experimental intertidal ecology (6) Tropical terrestrial ecology (6) The biology of marine mammals (6) Marine invertebrate zoology (6) Nearshore marine and estuarine ecology (6) Insect ecology: the little things that run the world (6)	[previous title: Terrestrail ecology (6) ]
BIOL3505	Oyster aquaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL4304	Ecosystem functioning and services (6)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone require	ment (6 credits)	
At least 6 credits s	elected from the following courses:	
BIOL3951	Ecology & biodiversity field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL3991	Directed studies in ecology & biodiversity (6)	
BIOL4911	Conservation science in practice (6)	
BIOL4921	Animal behaviour and behavioural ecology: field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL4991	Ecology & biodiversity project (12)	•

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2012

admitted to Year 1 in

### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

### Impermissible Combinations:

Minor in Ecology & Biodiversity

# Required courses (96 credits) 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

From molecules to cells (6) BIOL1110 Evolutionary diversity (6) BIOL1309

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

Ecology and evolution (6) **BIOL2306** 

# 2. Advanced level courses (48 credits) **Disciplinary Core Courses (12 credits)**

BIOL3302 Systematics and phylogenetics (6) Conservation biology (6) BIOL3303

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

Animal behaviour (6) BIOL3101

Take either BIOL3101 or BIOL4303 to fulfill this 36 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.

[previous title: Conservation ecology (6)]

Environmental microbiology (6) BIOL3109 BIOL3301 Marine biology (6) **BIOL3305** Tropical and temperate marine ecology field course (6) Freshwater ecology (6) BIOL3313 BIOL3314 Plant structure and evolution (6) Experimental intertidal ecology (6) **BIOL3318** 

BIOL3319 BIOL3320 BIOL3322 BIOL3328 BIOL3419	Tropical terrestrial ecology (6) The biology of marine mammals (6) Marine invertebrate zoology (6) Nearshore marine and estuarine ecology (6) Insect ecology: the little things that run the world (6)	[previous title: Terrestrial ecology (6) ]
BIOL3505	Oyster aquaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill this 36 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 36 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL4304	Ecosystem functioning and services (6)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 36 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone require	ement (6 credits)	
	selected from the following courses:	
BIOL3951	Ecology & biodiversity field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL3991	Directed studies in ecology & biodiversity (6)	•
BIOL4911	Conservation science in practice (6)	
BIOL4921	Animal behaviour and behavioural ecology: field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL4991	Ecology & biodiversity project (12)	•

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Environmental Science

2017

Offered to students

admitted to Year 1 in

### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

### Impermissible Combinations:

Minor in Environmental Science

### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6) May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)

MATH3408 Computational methods and differential equations with

applications (6)

STAT3611 Computer-aided data analysis (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)
ENVS4955 Environmental science in practice (6)
ENVS4966 Environmental science internship (6)
ENVS4999 Environmental science project (12)

### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Environmental Science

Offered to students 2016

admitted to Year 1 in

### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

### Impermissible Combinations:

Minor in Environmental Science

### Required courses (96 credits)

### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6) May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)

MATH3408 Computational methods and differential equations with

applications (6)

STAT3611 Computer-aided data analysis (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)
ENVS4955 Environmental science in practice (6)
ENVS4966 Environmental science internship (6)
ENVS4999 Environmental science project (12)

### Notes

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Environmental Science

Offered to students 2015

admitted to Year 1 in

### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

### Impermissible Combinations:

Minor in Environmental Science

### Required courses (96 credits)

### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)
Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6) May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)

MATH3408 Computational methods and differential equations with

applications (6)

STAT3611 Computer-aided data analysis (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)
ENVS4955 Environmental science in practice (6)
ENVS4966 Environmental science internship (6)
ENVS4999 Environmental science project (12)

### Notes

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Environmental Science

2014

Offered to students

admitted to Year 1 in

### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

### Impermissible Combinations:

Minor in Environmental Science

### Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6) May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)

MATH3408 Computational methods and differential equations with

applications (6)

STAT3611 Computer-aided data analysis (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)
ENVS4955 Environmental science in practice (6)
ENVS4966 Environmental science internship (6)
ENVS4999 Environmental science project (12)

### Notes

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Environmental Science

2013

Offered to students

admitted to Year 1 in

### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

### Impermissible Combinations:

Minor in Environmental Science

### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)
Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6) May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)

MATH3408 Computational methods and differential equations with

applications (6)

STAT3611 Computer-aided data analysis (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)
ENVS4955 Environmental science in practice (6)
ENVS4966 Environmental science internship (6)
ENVS4999 Environmental science project (12)

### Notes

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Environmental Science

Offered to students 2012

admitted to Year 1 in

### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

### Impermissible Combinations:

Minor in Environmental Science

### Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (12 credits)** 

ENVS1401 Introduction to environmental science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

May take either STAT1601 or STAT1603 to fulfill this 12 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 12 credits requirement, but not both.

# Disciplinary Electives (24 credits)

At least 12 credits selected from the following courses (Level 1) in List A:

List A

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6)

At least 12 credits selected from the following courses (Level 2) in List B:

List B

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS2001 Methods in environmental science (6) ENVS2002 Environmental data analysis (6)

# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)

ENVS3007 Natural hazards and mitigation (6) ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6)

ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)

MATH3408 Computational methods and differential equations with

applications (6)

STAT3611 Computer-aided data analysis (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)
ENVS4955 Environmental science in practice (6)
ENVS4966 Environmental science internship (6)
ENVS4999 Environmental science project (12)

### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Food & Nutritional Science

Offered to students 2017

admitted to Year 1 in

### **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a food-and/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Scientific method and reasoning (6) Fundamentals of modern science (6)

### **Disciplinary Core Courses (36 credits)**

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)
BIOL2101 Principles of food chemistry (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (18 credits)** 

BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)
BIOL3209 Food and nutrient analysis (6)

# Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

BIOL3204 Nutrition and the life cycle (6)
BIOL3205 Human physiology (6)
BIOL3206 Clinical nutrition (6)

BIOL3207 Food and nutritional toxicology (6)

BIOL3211 Nutrigenomics (6)

BIOL3215 Principles of dietary assessment (6)

BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	
BIOL4201	Public health nutrition (6)	
BIOL4202	Nutrition and sports performance (6)	
BIOL4205	Food processing and engineering (6)	
BIOL4208	Meat, dairy and grain sciences (6)	
BIOL4209	Functional foods (6)	
BIOL4411	Plant and food biotechnology (6)	
3. Capstone requi	rement (6 credits)	
At least 6 credits	s selected from the following courses:	
BIOL3992	Directed studies in food & nutritional science (6)	
BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4922	Food product development and evaluation (6)	
BIOL4962	Food & nutritional science internship (6)	
BIOL4992	Food & nutritional science project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
  (a) Food Science and Technology: BIOL3207; BIOL3209; BIOL3216; BIOL3218; BIOL4205; BIOL4208; BIOL4209; BIOL4411; BIOL4913;
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3211; BIOL3215; BIOL3217; BIOL3218; BIOL4201;
- 6. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

### Remarks:

Major Title Major in Food & Nutritional Science 2016

Offered to students

admitted to Year 1 in

### **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a foodand/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6) Introduction to food and nutrition (6) BIOL1201 BIOL1309 Evolutionary diversity (6)

Biostatistics (6) BIOL2102

BIOL2103 Biological sciences laboratory course (6)

Principles of biochemistry (6) BIOL2220

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fufill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fufill this 36 credits requirement, but not both BIOL2220 and BIOC2600 are mutually exclusive

### 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (18 credits)** 

BIOL3201 Food chemistry (6) Nutritional biochemistry (6) BIOL3202 Food microbiology (6) BIOL3203

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses: Nutrition and the life cycle (6) BIOL3204

Human physiology (6) BIOL3205 Clinical nutrition (6) BIOL3206

Food and nutritional toxicology (6) BIOL3207 **BIOL3208** Food safety and quality management (6)

DIOI 2200	Food and nutrient analysis (6)	Take either BIOL3208 or BIOL3218 to fufill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL3209 BIOL3210	Food and nutrient analysis (6) Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fufill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 are mutually exclusive.
BIOL3211	Nutrigenomics (6)	
BIOL3215	Principles of dietary assessment (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fufill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL4201	Public health nutrition (6)	
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food processing and engineering (6)	
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fufill this 24 credits requirement, but not both. BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208; BIOL4207 or BIOL4208 to fufill this 24 credits requirement, but not both. BIOL3210 and BIOL4208; BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	,
BIOL4411	Plant and food biotechnology (6)	
3. Capstone requir	rement (6 credits)	
At least 6 credits	selected from the following courses:	
BIOL3992	Directed studies in food & nutritional science (6)	
BIOL4912	Sensory evaluation of food (6)	
BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4922	Food product development and evaluation (6)	
BIOL4962	Food & nutritional science internship (6)	
BIOL4992	Food & nutritional science project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL4208; BIOL4205; BIOL4207 or BIOL4208; BIOL4411; BIOL4913; BIOL4922.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL4201; BIOL4202.
- 6. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

### Remarks:

Major Title Major in Food & Nutritional Science 2015

Offered to students

admitted to Year 1 in

### **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a foodand/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

### **Disciplinary Core Courses (36 credits)**

BIOL1110 From molecules to cells (6) Introduction to food and nutrition (6) BIOL1201 BIOL1309 Evolutionary diversity (6)

Biostatistics (6) BIOL2102

BIOL2103 Biological sciences laboratory course (6)

Principles of biochemistry (6) BIOL2220

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both BIOL2220 and BIOC2600 are mutually exclusive

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (18 credits)** 

BIOL3201 Food chemistry (6) Nutritional biochemistry (6) BIOL3202 Food microbiology (6) BIOL3203

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses: Nutrition and the life cycle (6) BIOL3204

Human physiology (6) BIOL3205 Clinical nutrition (6) BIOL3206

Food and nutritional toxicology (6) BIOL3207 **BIOL3208** Food safety and quality management (6)

BIOL3209 BIOL3210	Food and nutrient analysis (6) Grain production and utilization (6)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.  Take either BIOL3210 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL4208 and BIOL3218 are mutually
		exclusive.
BIOL3211	Nutrigenomics (6)	
BIOL3215	Principles of dietary assessment (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	T   "   DIOL 0000   DIOL 0040   6
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL4201	Public health nutrition (6)	ondere.
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food processing and engineering (6)	
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208; BIOL4207 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208; BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	•
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	
3. Capstone require		
	elected from the following courses:	
BIOL3992	Directed studies in food & nutritional science (6)	
BIOL4912	Sensory evaluation of food (6)	
BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4922	Food product development and evaluation (6)	
BIOL4962	Food & nutritional science internship (6)	
BIOL4992	Food & nutritional science project (12)	

- 1. BIOL4210 and BIOL4922 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for
- 6. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
  (a) Food Science and Technology: BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL3216; BIOL4205; BIOL4207 or BIOL4208; BIOL4209; BIOL4210 or BIOL4922; BIOL4411; BIOL4913.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL4201; BIOL4202.
- 7. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

Major Title Major in Food & Nutritional Science 2014

Offered to students

admitted to Year 1 in

### **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a foodand/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6) Introduction to food and nutrition (6) BIOL1201 BIOL1309 Evolutionary diversity (6)

Biostatistics (6) BIOL2102

BIOL2103 Biological sciences laboratory course (6)

Principles of biochemistry (6) BIOL2220

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fufill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fufill this 36 credits requirement, but not both BIOL2220 and BIOC2600 are mutually exclusive

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (18 credits)** 

BIOL3201 Food chemistry (6) Nutritional biochemistry (6) BIOL3202 Food microbiology (6) BIOL3203

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses: Nutrition and the life cycle (6) BIOL3204

Human physiology (6) BIOL3205 Clinical nutrition (6) BIOL3206

Food and nutritional toxicology (6) BIOL3207 BIOL3208 Food safety and quality management (6)

DIOLOGO	Food and nutrient analysis (0)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusvie.
BIOL3209 BIOL3210	Food and nutrient analysis (6) Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 are mutually exclusive.
BIOL3211	Nutrigenomics (6)	
BIOL3215	Principles of dietary assessment (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL4201	Public health nutrition (6)	
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food processing and engineering (6)	
BIOL4207	Meat and dairy sciences (6)	BIOL4207 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208; BIOL4207 or BIOL4208 to fulfill this 24 credits requirement; but not both, BIOL3210 and BIOL4208; BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	,
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	
3. Capstone requi	rement (6 credits)	
At least 6 credits	s selected from the following courses:	
BIOL3992	Directed studies in food & nutritional science (6)	
BIOL4912	Sensory evaluation of food (6)	
BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4922	Food product development and evaluation (6)	
BIOL4962	Food & nutritional science internship (6)	
BIOL4992	Food & nutritional science project (12)	

- 1. BIOL4210 and BIOL4922 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 6. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL3216; BIOL4205; BIOL4207 or BIOL4208; BIOL4210 or BIOL4222; BIOL4411; BIOL4913.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL4201; BIOL4202.
- 7. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

### Remarks:

Major Title Major in Food & Nutritional Science

Offered to students 2013

admitted to Year 1 in

### **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a food-and/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Scientific method and reasoning (6) Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

Disciplinary Electives (6 credits)

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

2. Advanced level courses (42 credits) Disciplinary Core Courses (18 credits)

BIOL3201 Food chemistry (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses: BIOL3204 Nutrition and the life cycle (6)

BIOL3205 Human physiology (6) Clinical nutrition (6) Take either BIOL2220 or BIOC2600 to fufill this 30 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fufill this 30 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

BIOL3206 BIOL3207	Food and nutritional toxicology (6)	
BIOL3208	Food safety and quality management (6)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL3209	Food and nutrient analysis (6)	Oxoldoivo.
BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 are mutually exclusive.
BIOL3211	Nutrigenomics (6)	
BIOL3215	Principles of dietary assessment (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL4201	Public health nutrition (6)	Cholusive.
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food processing and engineering (6)	
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208; BIOL4207 or BIOL4208 to fulfill this 24 credits requirement; but not both. BIOL3210 or BIOL4208; BIOL4207 or BIOL4208 are mutually exclusvie.
BIOL4209	Functional foods (6)	,
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	
3. Capstone requir	<b>37</b> ( )	
	selected from the following courses:	
BIOL3992	Directed studies in food & nutritional science (6)	
BIOL4912	Sensory evaluation of food (6)	
BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4922	Food product development and evaluation (6)	
BIOL4962	Food & nutritional science internship (6)	
BIOL4992	Food & nutritional science project (12)	

- 1. BIOL4210 and BIOL4922 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 6. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL3216; BIOL4205; BIOL4207 or BIOL4208; BIOL4210 or BIOL4202; BIOL4211; BIOL4411; BIOL4413.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL4201; BIOL4202.
- 7. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

### Remarks:

Major Title Major in Food & Nutritional Science

Offered to students 2012

admitted to Year 1 in

### Objectives:

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a food-and/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOL2306 Ecology and evolution (6)
BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (18 credits)** 

BIOL3201 Food chemistry (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

BIOL3204 Nutrition and the life cycle (6)
BIOL3205 Human physiology (6)
BIOL3206 Clinical nutrition (6)

BIOL3207 Food and nutritional toxicology (6)
BIOL3208 Food safety and quality management (6)

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.

BIOL3210 Grain production and utilization (6) Take either BIOL3210 or BIOL4 this 24 credits requirement, but BIOL3210 and BIOL4208 are mexclusive.	
BIOL3211 Nutrigenomics (6)	
BIOL3215 Principles of dietary assessment (6)	
BIOL3216 Food waste management (6)	
BIOL3217 Food, environment and health (6)	20101 6 1511
BIOL3218 Food hygiene and quality control (6) Take either BIOL3208 or BIOL3 this 24 credits requirement, but BIOL3208 and BIOL3218 are m exclusive.	not both.
BIOL4201 Public health nutrition (6)	
BIOL4202 Nutrition and sports performance (6)	
BIOL4204 Diet, brain function and behavior (6)	
BIOL4205 Food processing and engineering (6)	
BIOL4207 Meat and dairy sciences (6)  Take either BIOL4207 or BIOL4 this 24 credits requirement, but BIOL4207 and BIOL4208 are m exclusive.	not both.
BIOL4208 Meat, dairy and grain sciences (6)  Take either BIOL3210 or BIOL4 BIOL4207 or BIOL4208 to fulfill credits requirement, but not bot and BIOL4208; BIOL4207 and in mutually exclusive.	this 24 th. BIOL3210
BIOL4209 Functional foods (6)	
BIOL4210 Food product development (6)	
BIOL4411 Plant and food biotechnology (6)	
3. Capstone requirement (6 credits)	
At least 6 credits selected from the following courses:	
BIOL3992 Directed studies in food & nutritional science (6)	
BIOL4912 Sensory evaluation of food (6)	
BIOL4913 Advanced practicum on food and nutrient analysis (6)	
BIOL4922 Food product development and evaluation (6)	
BIOL4962 Food & nutritional science internship (6)	
BIOL4992 Food & nutritional science project (12)	

- 1. BIOL4210 and BIOL4922 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 6. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL3216; BIOL4205; BIOL4207 or BIOL4208; BIOL4209; BIOL4210 or BIOL4922; BIOL4911; BIOL4913.

  (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217;
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL4201; BIOL4202.
- 7. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

# Remarks

Major Title Major in Geology

Offered to students 2017

admitted to Year 1 in

### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

### Impermissible Combinations:

Minor in Earth Sciences

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112

# **Disciplinary Core Courses (30 credits)**

Principles of geology (6) EASC1402

Fluid/solid interactions in earth processes (6) EASC2401

Field and laboratory methods (6) EASC2402

EASC2406 Geochemistry (6) Mineralogy (6) FASC2407

# 2. Advanced level courses (48 credits) Disciplinary Core Courses (36 credits)

### EASC3402 Petrology (6)

Sedimentary environments (6) EASC3403 Structural geology (6) EASC3404 EASC3408 Geophysics (6)

Igneous and metamorphic petrogenesis (6) FASC3409 Earth dynamics & global tectonics (6) EASC4406

# **Disciplinary Electives (12 credits)**

# At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6) EASC3410 Hydrogeology (6) Earth resources (6) EASC3412 Engineering geology (6) **EASC3413** Soil and rock mechanics (6) EASC3414

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

Directed studies in earth sciences (6) EASC3999 Natural hazards and mitigation (6) ENVS3007 Biogeochemical cycles (6) FASC4403 EASC4407 Regional geology (6)

Special topics in earth sciences (6) EASC4408 Earth sciences project (12) EASC4999

# 3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Geology

Offered to students 2016

admitted to Year 1 in

### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

### Impermissible Combinations:

Minor in Earth Sciences

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (30 credits)**

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits) Disciplinary Core Courses (36 credits)

### Disciplinary Core Courses (36 Creul

EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6)
EASC3404 Structural geology (6)
EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

# At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6)
EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

# 3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Geology

Offered to students 2015

admitted to Year 1 in

### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

### Impermissible Combinations:

Minor in Earth Sciences

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112

# **Disciplinary Core Courses (30 credits)**

Principles of geology (6) EASC1402

Fluid/solid interactions in earth processes (6) EASC2401

Field and laboratory methods (6) EASC2402

EASC2406 Geochemistry (6) Mineralogy (6) FASC2407

# 2. Advanced level courses (48 credits) Disciplinary Core Courses (36 credits)

EASC3402 Petrology (6)

Sedimentary environments (6) EASC3403 Structural geology (6) EASC3404 EASC3408 Geophysics (6)

Igneous and metamorphic petrogenesis (6) EASC3409 EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

# At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6) EASC3410 Hydrogeology (6) Earth resources (6) EASC3412 Engineering geology (6) **EASC3413** Soil and rock mechanics (6) EASC3414

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

Directed studies in earth sciences (6) EASC3999 Natural hazards and mitigation (6) ENVS3007 Biogeochemical cycles (6) FASC4403 EASC4407 Regional geology (6)

Special topics in earth sciences (6) EASC4408 Earth sciences project (12) EASC4999

# 3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

# Remarks:

Major Title Major in Geology

Offered to students 2014

admitted to Year 1 in

### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

### Impermissible Combinations:

Minor in Earth Sciences

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (30 credits)**

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits) Disciplinary Core Courses (36 credits)

### EACC2402 Detrology (6)

EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6)
EASC3404 Structural geology (6)
EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

# At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6)
EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6)
EASC4999 Earth sciences project (12)

# 3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

# Remarks:

Major Title Major in Geology

Offered to students 2013

admitted to Year 1 in

### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

### Impermissible Combinations:

Minor in Earth Sciences

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (30 credits)**

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits) Disciplinary Core Courses (36 credits)

### EACC2402 Detrology (6)

EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6)
EASC3404 Structural geology (6)
EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

# At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6)
EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6)
EASC4999 Earth sciences project (12)

# 3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

# Remarks:

Major Title Major in Geology

Offered to students 2012

admitted to Year 1 in

### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

### Impermissible Combinations:

Minor in Earth Sciences

### Required courses (96 credits) 1. Introductory level courses (42 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112 **Disciplinary Core Courses (30 credits)** Principles of geology (6) EASC1402 Fluid/solid interactions in earth processes (6) EASC2401 Field and laboratory methods (6) EASC2402 EASC2406 Geochemistry (6) Mineralogy (6) FASC2407 2. Advanced level courses (48 credits) Disciplinary Core Courses (36 credits) EASC3402 Petrology (6) Sedimentary environments (6) EASC3403 Structural geology (6) EASC3404

EASC3408 Geophysics (6)

Igneous and metamorphic petrogenesis (6) FASC3409 Earth dynamics & global tectonics (6) EASC4406

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6) EASC3410 Hydrogeology (6) Earth resources (6) EASC3412 Engineering geology (6) **EASC3413** Soil and rock mechanics (6) EASC3414

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

Directed studies in earth sciences (6) EASC3999 Natural hazards and mitigation (6) ENVS3007 Biogeochemical cycles (6) FASC4403 EASC4407 Regional geology (6)

Special topics in earth sciences (6) EASC4408 Earth sciences project (12) EASC4999

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Mathematics

Offered to students 2017

admitted to Year 1 in

### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, logistics, management, research and further studies.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List	Α
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MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6) Introduction to differentiable manifolds (6) MATH4511 Scientific computing (6) MATH4602 MATH4902 Operations research II (6) Numerical methods for financial calculus (6) MATH4907 MATH7101 Intermediate complex analysis (6) Topics in geometry (6) MATH7201 Complex manifolds (6) MATH7202

MATH7217 Topics in financial mathematics (6)
MATH7219 Topics in applied functional analysis (6)
MATH7224 Topics in advanced probability theory (6)

MATH7501 Topics in algebra (6)

MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

MATH7504 Geometric topology (6) MATH7505 Real analysis (6)

### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

MATH3999 Directed studies in mathematics (6)
MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)

### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curricullum/overlapping-course-req.

### Remarks

Major Title Major in Mathematics

Offered to students 2016

admitted to Year 1 in

### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, logistics, management, research and further studies.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List	Α
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MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

ı	MATH4501	Geometry (6)	
ı	MATH4511	Introduction to differentiable manifolds (6)	
ı	MATH4602	Scientific computing (6)	
ı	MATH4902	Operations research II (6)	
ı	MATH4907	Numerical methods for financial calculus (6)	
ı	MATH7101	Intermediate complex analysis (6)	
ı	MATH7201	Topics in geometry (6)	
ı	MATH7202	Complex manifolds (6)	
ı	MATH7217	Topics in financial mathematics (6)	
ı	MATH7219	Topics in applied functional analysis (6)	
ı	MATH7224	Topics in advanced probability theory (6)	
ı	MATH7501	Topics in algebra (6)	
ı	MATH7502	Topics in applied discrete mathematics (6)	
ı	MATH7503	Topics in mathematical programming and optimization (6)	
ı	MATH7504	Geometric topology (6)	
ı	MATH7505	Real analysis (6)	
ı	3. Capstone requirement (6	credits)	
ı	At least 6 credits selected	from the following courses:	
ı	MATH3999	Directed studies in mathematics (6)	
ı	MATH4910	Senior mathematics seminar (6)	
ı	MATH4911	Mathematics capstone project (6)	
ı	MATH4966	Mathematics internship (6)	
ı	MATH4999	Mathematics project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curricullum/overlapping-course-req.

### Remarks:

Major Title Major in Mathematics

Offered to students 2015

admitted to Year 1 in

### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, logistics, management, research and further studies.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List	Α
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MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

ı	MATH4501	Geometry (6)	
ı	MATH4511	Introduction to differentiable manifolds (6)	
ı	MATH4602	Scientific computing (6)	
ı	MATH4902	Operations research II (6)	
ı	MATH4907	Numerical methods for financial calculus (6)	
ı	MATH7101	Intermediate complex analysis (6)	
ı	MATH7201	Topics in geometry (6)	
ı	MATH7202	Complex manifolds (6)	
ı	MATH7217	Topics in financial mathematics (6)	
ı	MATH7219	Topics in applied functional analysis (6)	
ı	MATH7224	Topics in advanced probability theory (6)	
ı	MATH7501	Topics in algebra (6)	
ı	MATH7502	Topics in applied discrete mathematics (6)	
ı	MATH7503	Topics in mathematical programming and optimization (6)	
ı	MATH7504	Geometric topology (6)	
ı	MATH7505	Real analysis (6)	
ı	3. Capstone requirement (6	credits)	
ı	At least 6 credits selected	from the following courses:	
ı	MATH3999	Directed studies in mathematics (6)	
ı	MATH4910	Senior mathematics seminar (6)	
ı	MATH4911	Mathematics capstone project (6)	
ı	MATH4966	Mathematics internship (6)	
ı	MATH4999	Mathematics project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curricullum/overlapping-course-req.

### Remarks:

Major Title Major in Mathematics

Offered to students 2014

admitted to Year 1 in

### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, logistics, management, research and further studies.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List	Α
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MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

П	MATH4501	Geometry (6)	
П	MATH4511	Introduction to differentiable manifolds (6)	
П	MATH4602	Scientific computing (6)	
П	MATH4902	Operations research II (6)	
П	MATH4907	Numerical methods for financial calculus (6)	
П	MATH7101	Intermediate complex analysis (6)	
П	MATH7201	Topics in geometry (6)	
П	MATH7202	Complex manifolds (6)	
П	MATH7217	Topics in financial mathematics (6)	
П	MATH7219	Topics in applied functional analysis (6)	
П	MATH7224	Topics in advanced probability theory (6)	
П	MATH7501	Topics in algebra (6)	
П	MATH7502	Topics in applied discrete mathematics (6)	
П	MATH7503	Topics in mathematical programming and optimization (6)	
П	MATH7504	Geometric topology (6)	
П	MATH7505	Real analysis (6)	
П	3. Capstone requirement (6	·	
П	At least 6 credits selected to		
П	MATH3999	Directed studies in mathematics (6)	
П	MATH4910	Senior mathematics seminar (6)	
П	MATH4911	Mathematics capstone project (6)	
П	MATH4966	Mathematics internship (6)	
П	MATH4999	Mathematics project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curricullum/overlapping-course-req.

### Remarks:

Major Title Major in Mathematics

Offered to students 2013

admitted to Year 1 in

### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, logistics, management, research and further studies.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

# Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List	Α
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MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

П	MATH4501	Geometry (6)	
П	MATH4511	Introduction to differentiable manifolds (6)	
П	MATH4602	Scientific computing (6)	
П	MATH4902	Operations research II (6)	
П	MATH4907	Numerical methods for financial calculus (6)	
П	MATH7101	Intermediate complex analysis (6)	
П	MATH7201	Topics in geometry (6)	
П	MATH7202	Complex manifolds (6)	
П	MATH7217	Topics in financial mathematics (6)	
П	MATH7219	Topics in applied functional analysis (6)	
П	MATH7224	Topics in advanced probability theory (6)	
П	MATH7501	Topics in algebra (6)	
П	MATH7502	Topics in applied discrete mathematics (6)	
П	MATH7503	Topics in mathematical programming and optimization (6)	
П	MATH7504	Geometric topology (6)	
П	MATH7505	Real analysis (6)	
П	3. Capstone requirement (6	,	
П	At least 6 credits selected i	<u> </u>	
П	MATH3999	Directed studies in mathematics (6)	
П	MATH4910	Senior mathematics seminar (6)	
П	MATH4911	Mathematics capstone project (6)	
	MATH4966	Mathematics internship (6)	
П	MATH4999	Mathematics project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curricullum/overlapping-course-req.

### Remarks:

Major Title Major in Mathematics

Offered to students 2012

admitted to Year 1 in

### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, logistics, management, research and further studies.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

### Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6)

SCNC1111 Scientific method and reasoning (6)
SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

# Disciplinary Electives (24 credits)

At least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)
MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)

MATH3901
MATH3901
MATH3901
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MATH3905
MATH3905
MATH3906
MATH3906
MATH3906

NATH3906

MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6) MATH4302 Algebra II (6)

MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511	Introduction to differentiable manifolds (6)	
MATH4602	Scientific computing (6)	
MATH4902	Operations research II (6)	
MATH4907	Numerical methods for financial calculus (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7217	Topics in financial mathematics (6)	
MATH7219	Topics in applied functional analysis (6)	
MATH7224	Topics in advanced probability theory (6)	
MATH7501	Topics in algebra (6)	
MATH7502	Topics in applied discrete mathematics (6)	
MATH7503	Topics in mathematical programming and optimization (6)	
MATH7504	Geometric topology (6)	
MATH7505	Real analysis (6)	
3. Capstone requirement (6 credits)		
At least 6 credits selected from the follo	wing courses:	
MATH3999	Directed studies in mathematics (6)	
MATH4910	Senior mathematics seminar (6)	
MATH4911	Mathematics capstone project (6)	
MATH4966	Mathematics internship (6)	
MATH4999	Mathematics project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

# Remarks:

Major Title Major in Mathematics/Physics

Offered to students 2017

admitted to Year 1 in

### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with a rigorous representation using their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle physical problems with intellectual rigor theoretically (by means of coursework, tutorial classes and assessments in the curriculum)
- PLO 3: apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

# Impermissible Combinations:

Major in Mathematics

Major in Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Minor in Physics

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2265 Modern physics (6)

**Disciplinary Electives (6 credits)** 

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introduction to relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (36 credits)

MATH3301 Algebra I (6)
MATH3401 Analysis I (6)
MATH4501 Geometry (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS4351 Advanced quantum mechanics (6)

Disciplinary Electives (6 credits)

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002	Mathematics seminar (6)
	` '
MATH3303	Matrix theory and its applications (6)
MATH3304	Introduction to number theory (6)
MATH3403	Functions of a complex variable (6)
MATH3405	Differential equations (6)
MATH3408	Computational methods and differential equations with
	applications (6)
MATH3541	Introduction to topology (6)
MATH3600	Discrete mathematics (6)
	` '
MATH3601	Numerical analysis (6)
MATH3603	Probability theory (6)
MATH3901	Operations research I (6)
	Introduction to optimization (6)
MATH3904	1
MATH3905	Queueing theory and simulation (6)
MATH3906	Financial calculus (6)
MATH3911	Game theory and strategy (6)
	•
MATH3943	Network models in operations research (6)
MATH4302	Algebra II (6)
MATH4402	Analysis II (6)
MATH4404	Functional analysis (6)
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MATH4406	Introduction to partial differential equations (6)
MATH4511	Introduction to differentiable manifolds (6)
MATH4602	Scientific computing (6)
	Operations research II (6)
MATH4902	1
MATH4907	Numerical methods for financial calculus (6)
MATH7101	Intermediate complex analysis (6)
MATH7201	Topics in geometry (6)
	. •
MATH7202	Complex manifolds (6)
MATH7217	Topics in financial mathematics (6)
MATH7219	Topics in applied functional analysis (6)
	Topics in advanced probability theory (6)
MATH7224	
MATH7501	Topics in algebra (6)
MATH7502	Topics in applied discrete mathematics (6)
MATH7503	Topics in mathematical programming and optimization (6)
MATH7504	Geometric topology (6)
MATH7505	Real analysis (6)
PHYS3150	Theoretical physics (6)
PHYS3450	Electromagnetism (6)
	• , ,
PHYS3550	Statistical mechanics & thermodynamics (6)
PHYS3551	Introductory solid state physics (6)
PHYS3650	Observational astronomy (6)
PHYS3651	The physical universe (6)
PHYS3652	Principles of astronomy (6)
PHYS3750	Laser and spectroscopy (6)
PHYS3751	Physics of nanomaterials (6)
PHYS3850	Waves and optics (6)
PHYS3851	Atomic and nuclear physics (6)
PHYS4150	Computational physics (6)
PHYS4151	Data analysis and modeling in physics (6)
	Advanced classical mechanics (6)
PHYS4350	` '
PHYS4450	Advanced electromagnetism (6)
PHYS4550	Advanced statistical mechanics (6)
	· •
	Solid state physics (6)
PHYS4551	Solid state physics (6)
PHYS4650	Stellar physics (6)
PHYS4650	Stellar physics (6)
PHYS4650 PHYS4651 PHYS4652	Stellar physics (6) Selected topics in astrophysics (6) Planetary science (6)
PHYS4650 PHYS4651 PHYS4652 PHYS4653	Stellar physics (6) Selected topics in astrophysics (6) Planetary science (6) Cosmology (6)
PHYS4650 PHYS4651 PHYS4652 PHYS4653 PHYS4654	Stellar physics (6) Selected topics in astrophysics (6) Planetary science (6) Cosmology (6) General relativity (6)
PHYS4650 PHYS4651 PHYS4652 PHYS4653	Stellar physics (6) Selected topics in astrophysics (6) Planetary science (6) Cosmology (6)
PHYS4650 PHYS4651 PHYS4652 PHYS4653 PHYS4654	Stellar physics (6) Selected topics in astrophysics (6) Planetary science (6) Cosmology (6) General relativity (6)
PHYS4650 PHYS4651 PHYS4652 PHYS4653 PHYS4654 PHYS4655 PHYS4750	Stellar physics (6) Selected topics in astrophysics (6) Planetary science (6) Cosmology (6) General relativity (6) Interstellar medium (6) Experimental physics (6)
PHYS4650 PHYS4651 PHYS4652 PHYS4653 PHYS4654 PHYS4655 PHYS4750 PHYS4850	Stellar physics (6) Selected topics in astrophysics (6) Planetary science (6) Cosmology (6) General relativity (6) Interstellar medium (6) Experimental physics (6) Particle physics (6)
PHYS4650 PHYS4651 PHYS4652 PHYS4653 PHYS4654 PHYS4655 PHYS4750 PHYS4850 PHYS7350	Stellar physics (6) Selected topics in astrophysics (6) Planetary science (6) Cosmology (6) General relativity (6) Interstellar medium (6) Experimental physics (6) Particle physics (6) Graduate classical mechanics (6)
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PHYS4966	
PHYS4999	

Physics internship (6) Physics project (12)

### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 7. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

### Remarks

Major Title Major in Mathematics/Physics

Offered to students 2016

admitted to Year 1 in

### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with a rigorous representation using their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle physical problems with intellectual rigor theoretically (by means of coursework, tutorial classes and assessments in the curriculum)
- PLO 3: apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

# Impermissible Combinations:

Major in Mathematics

Major in Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Minor in Physics

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (30 credits)** 

University mathematics II (6) MATH1013 Linear algebra I (6) MATH2101 MATH2211 Multivariable calculus (6) PHYS1250 Fundamental physics (6) Modern physics (6) **PHYS2265** 

**Disciplinary Electives (6 credits)** 

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6) **PHYS2055** Introduction to relativity (6) PHYS2150 Methods in physics I (6) PHYS2155 Methods in physics II (6) PHYS2250 Introductory mechanics (6)

**PHYS2255** Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

2. Advanced level courses (42 credits) **Disciplinary Core Courses (36 credits)** 

MATH3301

Algebra I (6) Analysis I (6) MATH3401 Geometry (6) MATH4501 Classical mechanics (6) PHYS3350 PHYS3351 Quantum mechanics (6) Advanced quantum mechanics (6) PHYS4351

**Disciplinary Electives (6 credits)** 

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Matrix theory and its applications (5) MATH3303 Matrix theory and its applications (5) MATH3404 Introduction to number theory (6) MATH3405 Participate of a complex variable (7) MATH3406 Participate of a complex variable (7) MATH3407 Participate of a complex variable (7) MATH3507 Participate of a complex variable (7) MATH3508 Participate of a complex variable (8) MATH3509 Participate of a complex variable (8) MATH3500 Participate of a complex variable (8) MATH3501 Participate of a complex variable (8) MATH3501 Participate of a complex variable (8) MATH3503 Participate of a complex variable (8) MATH3504 Participate of a complex variable (8) MATH3505 Quality (8) MATH3506 Participate of a complex variable (8) MATH3506 Participate of a complex variable (8) MATH3507 Participate of a complex variable (8) MATH4402 Algebra (8) MATH4402 Algebra (8) MATH4402 Participate of a complex variable (8) MATH4404 Participate of a complex variable (8) MATH4406 Participate of a complex variable (8) MATH4407 Participate of a complex variable (8) MATH4408 Participate of a complex variable (8) MATH4409 Participate of a complex variable (8) MATH4401 Participate of a complex variable (9) MATH4402 Participate of a complex variable (9) MATH4401 Participate of a complex variable (9) MATH4402 Participate of a complex variable (9) MATH4401 Participate of a complex variable (9) MATH4402 Participate of a complex variable (9) MATH4403 Participate of a complex variable (9) MATH4404 Participate of a complex variable (9) MATH4407 Participate of a complex variable (9) MATH4408 Participate of a complex variable (9) MATH4409 Participate of a complex variable (9) MATH4401 Participate of a complex variable of a complex variable (9) Participate of a complex variable of a complex variabl	L.,	
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MATH3304 Introduction to number theory (6) MATH3405 Purctions of a complex variable (6) MATH3406 Differential equations (8) MATH3406 Computations (6) MATH3501 Discreti mathematics (6) MATH3501 Discreti mathematics (6) MATH3503 Probability theory (7) MATH3503 Probability theory (8) MATH3504 Introduction to populosy (8) MATH3504 Computation to optimization (6) MATH3504 Computation to optimization (6) MATH3504 Computation to optimization (7) MATH3505 Computation to optimization (7) MATH3506 Computation to optimization (8) MATH3501 Computation to optimization (8) MATH3402 Algebra II (8) MATH4402 Analysis II (8) MATH4404 Functional analysis (7) MATH4404 Introduction to parial differential equations (8) MATH4401 Introduction to optimization to differentiable manifolis (8) MATH4401 Introduction to optimization of differentiable manifolis (8) MATH4401 Computation to differentiable manifolis (9) MATH4407 Intermediate complex analysis (8) MATH4407 Computation to differentiable manifolis (9) MATH4701 Intermediate complex analysis (9) MATH4701 Topics in spender (9) MATH47		( )
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MATH-3541   Introduction to topology (8)		! ','
MATH35610         Infroduction to topology (6)           MATH35601         Numerical analysis (6)           MATH35603         Probability theory (6)           MATH3504         Numerical analysis (7)           MATH3505         Department of the control of	MATH3408	'
MATH3601   Numerical analysis (6)   MATH3601   Numerical analysis (7)   MATH3601   Numerical analysis (8)   MATH3901   Operations research (8)   Introduction to optimization (8)   MATH3905   Operations research (8)   Introduction to optimization (8)   MATH3905   Outside pheny and strategy (6)   MATH3906   Financial coloulus (8)   MATH3918   MATH391		
MATH3601         Numerical analysis (6)           MATH3603         Probability theory (6)           MATH3904         Operations research (6)           MATH3905         Operations research (6)           MATH3906         Introduction to optimization (6)           MATH3907         Amantal calculus (6)           MATH4912         Analysis (6)           MATH4912         Alaptic (6)           MATH4404         Alaptic (7)           MATH4405         Alaptic (7)           MATH4406         Functional analysis (6)           MATH4401         Introduction to partial differential equations (6)           MATH4902         Operations research (1)           MATH4901         Numerical methods for financial calculus (6)           MATH4902         Operation research (1)           MATH701         Intermediate complex analysis (6)           MATH701         Intermediate complex analysis (6)           MATH701         Intermediate complex analysis (6)           MATH7201         Topics in agenited functional analysis (6)           MATH7202         Topics in agenited functional analysis (6)           MATH7203         Topics in applied functional analysis (6)           MATH7504         Topics in applied discrete mathematics (6)           MATH7505 <td< td=""><th>MATH3541</th><td>Introduction to topology (6)</td></td<>	MATH3541	Introduction to topology (6)
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PHYS3999 Directed studies in physics (6)		
	PHYS3999	Directed studies in physics (6)

PHYS4966
PHYS4999

Physics internship (6) Physics project (12)

### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 7. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

### Remarks

Major Title Major in Mathematics/Physics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with a rigorous representation using their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle physical problems with intellectual rigor theoretically (by means of coursework, tutorial classes and assessments in the curriculum)
- PLO 3: apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics

Major in Physics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Minor in Physics

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2265 Modern physics (6)

**Disciplinary Electives (6 credits)** 

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introduction to relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

2. Advanced level courses (42 credits)

**Disciplinary Core Courses (36 credits)** 

MATH3301 Algebra I (6)
MATH3401 Analysis I (6)
MATH4501 Geometry (6)

PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS4351 Advanced quantum mechanics (6)

Disciplinary Electives (6 credits)

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

L	
MATH3303	Matrix theory and its applications (6)
MATH3304	Introduction to number theory (6)
MATH3403	Functions of a complex variable (6)
MATH3405	Differential equations (6)
MATH3408	Computational methods and differential equations with
	applications (6)
MATH3541	Introduction to topology (6)
MATH3600	Discrete mathematics (6)
MATH3601	Numerical analysis (6)
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MATH3603	Probability theory (6)
MATH3901	Operations research I (6)
MATH3904	Introduction to optimization (6)
	Queueing theory and simulation (6)
MATH3905	
MATH3906	Financial calculus (6)
MATH3911	Game theory and strategy (6)
MATH3943	Network models in operations research (6)
MATH4302	Algebra II (6)
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MATH4402	Analysis II (6)
MATH4404	Functional analysis (6)
MATH4406	Introduction to partial differential equations (6)
MATH4511	Introduction to differentiable manifolds (6)
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MATH4602	Scientific computing (6)
MATH4902	Operations research II (6)
MATH4907	Numerical methods for financial calculus (6)
MATH7101	Intermediate complex analysis (6)
MATH7201	Topics in geometry (6)
MATH7202	Complex manifolds (6)
MATH7217	Topics in financial mathematics (6)
MATH7219	Topics in applied functional analysis (6)
MATH7224	Topics in advanced probability theory (6)
MATH7501	Topics in algebra (6)
MATH7502	Topics in applied discrete mathematics (6)
MATH7503	Topics in mathematical programming and optimization (6)
MATH7504	Geometric topology (6)
MATH7505	Real analysis (6)
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PHYS3150	Theoretical physics (6)
PHYS3450	Electromagnetism (6)
∥∥ PHYS3550	Statistical mechanics & thermodynamics (6)
PHYS3551	Introductory solid state physics (6)
PHYS3650	Observational astronomy (6)
PHYS3651	The physical universe (6)
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PHYS3652	Principles of astronomy (6)
PHYS3750	Laser and spectroscopy (6)
PHYS3751	Physics of nanomaterials (6)
PHYS3850	Waves and optics (6)
PHYS3851	Atomic and nuclear physics (6)
PHYS4150	Computational physics (6)
PHYS4151	Data analysis and modeling in physics (6)
PHYS4350	Advanced classical mechanics (6)
PHYS4450	Advanced electromagnetism (6)
PHYS4550	Advanced statistical mechanics (6)
PHYS4551	Solid state physics (6)
PHYS4650	Stellar physics (6)
PHYS4651	Selected topics in astrophysics (6)
PHYS4652	Planetary science (6)
PHYS4653	Cosmology (6)
	General relativity (6)
PHYS4654	• • • •
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
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PHYS7351	Graduate quantum mechanics (6)
PHYS7450	Graduate electromagnetism (6)
PHYS7550	Graduate statistical mechanics (6)
PHYS7551	Graduate solid state physics (6)
PHYS7650	Stellar atmospheres (6)
PHYS7750	Nanophysics (6)
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3. Capstone requirement (6 credits)	
At least 6 credits selected from the follo	
MATH3999	Directed studies in mathematics (6)
MATH4910	Senior mathematics seminar (6)
MATH4911	Mathematics capstone project (6)
	Mathematics internship (6)
MATH4966	
MATH4999	Mathematics project (12)
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)

**PHYS4999** 

Physics project (12)

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
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- 6. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
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- 7. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

## Remarks:

Major Title Major in Mathematics/Physics

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

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- PLO 2: have developed their scientific intuition, abilities and techniques to tackle physical problems with intellectual rigor theoretically (by means of coursework, tutorial classes and assessments in the curriculum)
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- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics

Major in Physics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Minor in Physics

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (36 credits)** 

 MATH3301
 Algebra I (6)

 MATH3401
 Analysis I (6)

 MATH4501
 Geometry (6)

 PHYS3350
 Classical mechanics (6)

PHYS3351 Quantum mechanics (6) PHYS4351 Advanced quantum mechanics (6)

# Disciplinary Electives (6 credits)

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6)
MATH3304 Introduction to number theory (6)
MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)

MATHOOO	Drahakiliku thaan (C)
MATH3603	Probability theory (6)
MATH3901	Operations research I (6)
MATH3904	Introduction to optimization (6)
MATH3905	Queueing theory and simulation (6)
MATH3906	Financial calculus (6)
MATH3911	Game theory and strategy (6)
MATH3943	Network models in operations research (6)
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MATH4302	Algebra II (6)
MATH4402	Analysis II (6)
MATH4404	Functional analysis (6)
MATH4406	Introduction to partial differential equations (6)
MATH4511	Introduction to differentiable manifolds (6)
MATH4602	Scientific computing (6)
MATH4902	Operations research II (6)
	Numerical methods for financial calculus (6)
MATH4907	` '
MATH7101	Intermediate complex analysis (6)
MATH7201	Topics in geometry (6)
MATH7202	Complex manifolds (6)
MATH7217	Topics in financial mathematics (6)
MATH7219	Topics in applied functional analysis (6)
MATH7224	Topics in advanced probability theory (6)
MATH7501	Topics in algebra (6)
MATH7502	Topics in applied discrete mathematics (6)
MATH7502 MATH7503	Topics in applied discrete matternatics (d)  Topics in mathematical programming and optimization (6)
MATH7504	Geometric topology (6)
MATH7505	Real analysis (6)
PHYS3150	Theoretical physics (6)
PHYS3450	Electromagnetism (6)
PHYS3550	Statistical mechanics & thermodynamics (6)
PHYS3551	Introductory solid state physics (6)
PHYS3650	Observational astronomy (6)
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PHYS3652	Principles of astronomy (6)
	Laser and spectroscopy (6)
PHYS3750	1 17 17
PHYS3751	Physics of nanomaterials (6)
PHYS3850	Waves and optics (6)
PHYS3851	Atomic and nuclear physics (6)
PHYS4150	Computational physics (6)
PHYS4151	Data analysis and modeling in physics (6)
PHYS4350	Advanced classical mechanics (6)
PHYS4450	Advanced electromagnetism (6)
PHYS4550	Advanced statistical mechanics (6)
PHYS4551	Solid state physics (6)
PHYS4650	Stellar physics (6)
PHYS4651	Selected topics in astrophysics (6)
	Planetary science (6)
PHYS4652	•
PHYS4653	Cosmology (6)
PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
PHYS7351	Graduate quantum mechanics (6)
PHYS7450	Graduate electromagnetism (6)
PHYS7550	Graduate statistical mechanics (6)
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PHYS7551	Graduate solid state physics (6)
PHYS7650	Stellar atmospheres (6)
PHYS7750	Nanophysics (6)
3. Capstone requirement (6 credits)	
At least 6 credits selected from the following	
MATH3999	Directed studies in mathematics (6)
MATH4910	Senior mathematics seminar (6)
MATH4911	Mathematics capstone project (6)
MATH4966	Mathematics internship (6)
MATH4999	Mathematics project (12)
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)
	Physics project (12)
PHYS4999	i nysios project (12)

<sup>1.</sup> Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks

Major Title Major in Mathematics/Physics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with a rigorous representation using their professional knowledge (by means of coursework and tutorial classes in the curriculum)
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- PLO 3: apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
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## Impermissible Combinations:

Major in Mathematics

Major in Physics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Minor in Physics

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (36 credits)** 

MATH3301 Algebra I (6)
MATH3401 Analysis I (6)
MATH4501 Geometry (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)

PHYS4351 Advanced quantum mechanics (6)

## **Disciplinary Electives (6 credits)**

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6)
MATH3304 Introduction to number theory (6)
MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)

MATH2602	Probability theory (6)
MATH3603	• • • • •
MATH3901	Operations research I (6)
MATH3904	Introduction to optimization (6)
MATH3905	Queueing theory and simulation (6)
MATH3906	Financial calculus (6)
MATH3911	Game theory and strategy (6)
	* ** **
MATH3943	Network models in operations research (6)
MATH4302	Algebra II (6)
MATH4402	Analysis II (6)
MATH4404	Functional analysis (6)
MATH4406	Introduction to partial differential equations (6)
	Introduction to differentiable manifolds (6)
MATH4511	* *
MATH4602	Scientific computing (6)
MATH4902	Operations research II (6)
MATH4907	Numerical methods for financial calculus (6)
MATH7101	Intermediate complex analysis (6)
MATH7201	Topics in geometry (6)
	Complex manifolds (6)
MATH7202	
MATH7217	Topics in financial mathematics (6)
MATH7219	Topics in applied functional analysis (6)
MATH7224	Topics in advanced probability theory (6)
MATH7501	Topics in algebra (6)
MATH7502	Topics in applied discrete mathematics (6)
	Topics in mathematical programming and optimization (6)
MATH7503	
MATH7504	Geometric topology (6)
MATH7505	Real analysis (6)
PHYS3150	Theoretical physics (6)
PHYS3450	Electromagnetism (6)
PHYS3550	Statistical mechanics & thermodynamics (6)
PHYS3551	Introductory solid state physics (6)
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PHYS7550	Graduate statistical mechanics (6)
PHYS7551	Graduate solid state physics (6)
PHYS7650	Stellar atmospheres (6)
PHYS7750	Nanophysics (6)
3. Capstone requirement (6 credits)	
At least 6 credits selected from the follo	wing courses.
MATH4949	Directed studies in mathematics (6)
MATH4910	Senior mathematics seminar (6)
MATH4911	Mathematics capstone project (6)
MATH4966	Mathematics internship (6)
MATH4999	Mathematics project (12)
PHYS3999	Directed studies in physics (6)
	Physics internship (6)
PHYS4966	• • • • • • • • • • • • • • • • • • • •
PHYS4999	Physics project (12)

<sup>1.</sup> Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

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- 5. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks

Major Title Major in Mathematics/Physics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with a rigorous representation using their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle physical problems with intellectual rigor theoretically (by means of coursework, tutorial classes and assessments in the curriculum)
- PLO 3: apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics Major in Physics Minor in Mathematics Minor in Physics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

## 2. Advanced level courses (42 credits) Disciplinary Core Courses (36 credits)

MATH3301 Algebra I (6)
MATH3401 Analysis I (6)
MATH4501 Geometry (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)

PHYS4351 Advanced quantum mechanics (6)

## **Disciplinary Electives (6 credits)**

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6)
MATH3304 Introduction to number theory (6)
MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)

MATHOOGA	On anti-one and a total
MATH3901	Operations research I (6)
MATH3904	Introduction to optimization (6)
MATH3905	Queueing theory and simulation (6)
MATH3906	Financial calculus (6)
MATH3911	Game theory and strategy (6)
MATH3943	Network models in operations research (6)
MATH4302	Algebra II (6)
MATH4402	Analysis II (6)
MATH4404	Functional analysis (6)
MATH4406	Introduction to partial differential equations (6)
MATH4511	Introduction to differentiable manifolds (6)
MATH4602	Scientific computing (6)
MATH4902	Operations research II (6)
MATH4902 MATH4907	
	Numerical methods for financial calculus (6)
MATH7101	Intermediate complex analysis (6)
MATH7201	Topics in geometry (6)
MATH7202	Complex manifolds (6)
MATH7217	Topics in financial mathematics (6)
MATH7219	Topics in applied functional analysis (6)
MATH7224	Topics in advanced probability theory (6)
	Topics in algebra (6)
MATH7501	
MATH7502	Topics in applied discrete mathematics (6)
MATH7503	Topics in mathematical programming and optimization (6)
MATH7504	Geometric topology (6)
MATH7505	Real analysis (6)
PHYS3150	Theoretical physics (6)
PHYS3450	Electromagnetism (6)
PHYS3550	Statistical mechanics & thermodynamics (6)
PHYS3551	Introductory solid state physics (6)
PHYS3650	Observational astronomy (6)
PHYS3651	The physical universe (6)
PHYS3652	Principles of astronomy (6)
PHYS3750	Laser and spectroscopy (6)
PHYS3751	Physics of nanomaterials (6)
PHYS3850	Waves and optics (6)
PHYS3851	Atomic and nuclear physics (6)
PHYS4150	Computational physics (6)
PHYS4151	Data analysis and modeling in physics (6)
PHYS4350	Advanced classical mechanics (6)
PHYS4450	Advanced electromagnetism (6)
PHYS4550	Advanced statistical mechanics (6)
PHYS4551	Solid state physics (6)
PHYS4650	Stellar physics (6)
PHYS4651	Selected topics in astrophysics (6)
PHYS4652	Planetary science (6)
PHYS4653	Cosmology (6)
PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
PHYS7351	Graduate quantum mechanics (6)
PHYS7450	Graduate electromagnetism (6)
PHYS7550	Graduate statistical mechanics (6)
PHYS7551	Graduate solid state physics (6)
PHYS7650	Stellar atmospheres (6)
PHYS7750	Nanophysics (6)
3. Capstone requirement (6 credits)	
At least 6 credits selected from the follo	owing courses:
MATH3999	Directed studies in mathematics (6)
MATH4910	Senior mathematics seminar (6)
MATH4910 MATH4911	Mathematics capstone project (6)
MATH4966	Mathematics internship (6)
MATH4999	Mathematics project (12)
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)
PHYS4999	Physics project (12)

<sup>1.</sup> Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

<sup>2.</sup> If more than 24 credits (including SCNC1111 & SCNC11112) are listed as required courses ("disciplinary core") in both the first and second

majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

## Remarks:

Major Title Major in Molecular Biology & Biotechnology

2017

Offered to students

admitted to Year 1 in

## **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop variousessential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Minor in Molecular Biology & Biotechnology

## Required courses (96 credits)

## 1. Introductory level courses (42 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

## 2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3508 Microbial physiology and biotechnology (6)
BIOL4411 Plant and food biotechnology (6)

BIOL4415 Healthcare biotechnology (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

BIOL3408 Genetics (6)

BIOL3409 Business aspects of biotechnology (6)

BIOL4401 Medical microbiology and applied immunology (6)

BIOL4409 General virology (6)

BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)
ENVS4110 Environmental remediation (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

## 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3993 Directed studies in Molecular biology & biotechnology (6)

BIOL4963 Molecular biology & biotechnology internship (6) BIOL4993 Molecular biology & biotechnology project (12)

## Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Molecular Biology & Biotechnology

2016

Offered to students

admitted to Year 1 in

## **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop variousessential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Minor in Molecular Biology & Biotechnology

## Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Scientific method and reasoning (6) Fundamentals of modern science (6)

Disciplinary Core Courses (24 credits)

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3508 Microbial physiology and biotechnology (6)
BIOL4411 Plant and food biotechnology (6)

BIOL4415 Healthcare biotechnology (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

BIOL3408 Genetics (6)

BIOL3409 Business aspects of biotechnology (6)

BIOL4401 Medical microbiology and applied immunology (6)

BIOL4409 General virology (6)

BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)
ENVS4110 Environmental remediation (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

## 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3993 Directed studies in Molecular biology & biotechnology (6)

BIOL4963 Molecular biology & biotechnology internship (6) BIOL4993 Molecular biology & biotechnology project (12)

## Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Molecular Biology & Biotechnology

2015

Offered to students

admitted to Year 1 in

## **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop variousessential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Minor in Molecular Biology & Biotechnology

Required	COURSES	(96	credits	١

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3508 Microbial physiology and biotechnology (6)

BIOL4402 Microbial biotechnology (6)

BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6) BIOL3405 Molecular microbiology (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

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	BIOL3408	Genetics (6)		
	BIOL3409	Business aspects of biotechnology (6)		
	BIOL4401	Medical microbiology and applied immunology (6)		
	BIOL4409	General virology (6)		
	BIOL4416	Stem cells and regenerative biology (6)		
	BIOL4417	'Omics' and systems biology (6)		
	ENVS4110	Environmental remediation (6)		
	3. Capstone requirement (6 credits)			
	At least 6 credits selected from the following courses:			
	BIOL3993	Directed studies in Molecular biology & biotechnology (6)		
	BIOL4963	Molecular biology & biotechnology internship (6)		
	BIOL4993	Molecular biology & biotechnology project (12)		

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

## Remarks:

Major Title Major in Molecular Biology & Biotechnology

2014

Offered to students

admitted to Year 1 in

## **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop variousessential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Minor in Molecular Biology & Biotechnology

## Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (24 credit)

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3508 Microbial physiology and biotechnology (6)

BIOL4402 Microbial biotechnology (6)

BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

**Disciplinary Electives (18 credit)** 

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6) BIOL3405 Molecular microbiology (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

L				
	BIOL3408	Genetics (6)		
	BIOL3409	Business aspects of biotechnology (6)		
	BIOL4401	Medical microbiology and applied immunology (6)		
	BIOL4409	General virology (6)		
	BIOL4416	Stem cells and regenerative biology (6)		
	BIOL4417	'Omics' and systems biology (6)		
	ENVS4110	Environmental remediation (6)		
3. 0	3. Capstone requirement (6 credits)			
/	At least 6 credits selected from the following courses:			
	BIOL3993	Directed studies in Molecular biology & biotechnology (6)		
	BIOL4963	Molecular biology & biotechnology internship (6)		
	BIOL4993	Molecular biology & biotechnology project (12)		

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

## Remarks:

Major Title Major in Molecular Biology & Biotechnology

2013

Offered to students

admitted to Year 1 in

## **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop variousessential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Minor in Molecular Biology & Biotechnology

## Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3508 Microbial physiology and biotechnology (6)

BIOL4402 Microbial biotechnology (6)

BIOL4411 Plant and food biotechnology (6) BIOL4415 Healthcare biotechnology (6)

Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6) BIOL3405 Molecular microbiology (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

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Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

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Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

	BIOL3408 BIOL3409	Genetics (6) Business aspects of biotechnology (6)		
Ш	BIOL4401	Medical microbiology and applied immunology (6)		
Ш	BIOL4409	General virology (6)		
Ш	BIOL4416	Stem cells and regenerative biology (6)		
Ш	BIOL4417	'Omics' and systems biology (6)		
Ш	ENVS4110	Environmental remediation (6)		
Ш	3. Capstone requirement (6 credits)			
Ш	At least 6 credits selected from the following courses:			
Ш	BIOL3993	Directed studies in Molecular biology & biotechnology (6)		
Ш	BIOL4963	Molecular biology & biotechnology internship (6)		
	BIOL4993	Molecular biology & biotechnology project (12)		

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

## Remarks:

Major Title Major in Molecular Biology & Biotechnology

2012

Offered to students

admitted to Year 1 in

## **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop variousessential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

## Impermissible Combinations:

Minor in Molecular Biology & Biotechnology

1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (24 credits)

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3508 Microbial physiology and biotechnology (6)

BIOL4402 Microbial biotechnology (6)

BIOL4411 Plant and food biotechnology (6) BIOL4415 Healthcare biotechnology (6)

Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6) BIOL3405 Molecular microbiology (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

L				
	BIOL3408	Genetics (6)		
	BIOL3409	Business aspects of biotechnology (6)		
	BIOL4401	Medical microbiology and applied immunology (6)		
	BIOL4409	General virology (6)		
	BIOL4416	Stem cells and regenerative biology (6)		
	BIOL4417	'Omics' and systems biology (6)		
	ENVS4110	Environmental remediation (6)		
3. 0	3. Capstone requirement (6 credits)			
/	At least 6 credits selected from the following courses:			
	BIOL3993	Directed studies in Molecular biology & biotechnology (6)		
	BIOL4963	Molecular biology & biotechnology internship (6)		
	BIOL4993	Molecular biology & biotechnology project (12)		

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

## Remarks:

Major Title Major in Physics

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-word setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6) PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6) PHYS2265 Modern physics (6)

## **Disciplinary Electives (6 credits)**

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introduction to relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

## 2. Advanced level courses (42 credits) Disciplinary Core Courses (24 credits)

PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A
PHYS3150 Theoretical physics (6)
PHYS3551 Introductory solid state physics (6)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)
PHYS3850 Waves and optics (6)

PHYS3851 Atomic and nuclear physics (6)
PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551	Solid state physics (6)	
PHYS4650	Stellar physics (6)	
PHYS4651	Selected topics in astrophysics (6)	
PHYS4652	Planetary science (6)	
PHYS4653	Cosmology (6)	
PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7650	Stellar atmospheres (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requirement (6 credits)		
At least 6 credits selected from the following courses:		

PHYS3999 Directed studies in physics (6) **PHYS4966** Physics internship (6) Physics project (12) PHYS4999

## Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc svllabuses.
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- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Major Title Major in Physics

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-word setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

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PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6) PHYS2265 Modern physics (6)

**Disciplinary Electives (6 credits)** 

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introduction to relativity (6)
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## 2. Advanced level courses (42 credits) Disciplinary Core Courses (24 credits)

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At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

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PHYS4653	Cosmology (6)	
PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
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PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7650	Stellar atmospheres (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requirement (6 credits)		

At least 6 credits selected from the following courses:

PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

## Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
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- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

## Remarks:

Major Title Major in Physics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
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- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-word setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6) PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6) PHYS2265 Modern physics (6)

## **Disciplinary Electives (6 credits)**

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introduction to relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

## 2. Advanced level courses (42 credits) Disciplinary Core Courses (24 credits)

PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A
PHYS3150 Theoretical physics (6)
PHYS3551 Introductory solid state physics (6)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)
PHYS3850 Waves and optics (6)

PHYS3851 Atomic and nuclear physics (6)
PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551	Solid state physics (6)
PHYS4650	Stellar physics (6)
PHYS4651	Selected topics in astrophysics (6)
PHYS4652	Planetary science (6)
PHYS4653	Cosmology (6)
PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
PHYS7351	Graduate quantum mechanics (6)
PHYS7450	Graduate electromagnetism (6)
PHYS7550	Graduate statistical mechanics (6)
PHYS7551	Graduate solid state physics (6)
PHYS7650	Stellar atmospheres (6)
PHYS7750	Nanophysics (6)
3. Capstone requirement (6 credits)	

At least 6 credits selected from the following courses:

PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

## Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

## Remarks

Major Title Major in Physics

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-word setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

PHYS1150 Problem solving in physics (6)
PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6) PHYS2265 Modern physics (6)

# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (24 credits)

PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A

PHYS3150 Theoretical physics (6)

PHYS3551 Introductory solid state physics (6) **PHYS3650** Observational astronomy (6) PHYS3651 The physical universe (6) Principles of astronomy (6) **PHYS3652** Laser and spectroscopy (6) PHYS3750 PHYS3751 Physics of nanomaterials (6) **PHYS3850** Waves and optics (6) Atomic and nuclear physics (6) PHYS3851 Computational physics (6) PHYS4150

PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6) PHYS4653 Cosmology (6)

DUN04054	Conord valetivity (C)
PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
PHYS7351	Graduate quantum mechanics (6)
PHYS7450	Graduate electromagnetism (6)
PHYS7550	Graduate statistical mechanics (6)
PHYS7551	Graduate solid state physics (6)
PHYS7650	Stellar atmospheres (6)
PHYS7750	Nanophysics (6)

## 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

## Remarks:

Major Title Major in Physics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-word setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

PHYS1150 Problem solving in physics (6)
PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6) PHYS2265 Modern physics (6)

# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (24 credits)

PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

# Disciplinary Electives (18 credits)

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A
PHYS3150 Theoretical physics (6)
PHYS3551 Introductory solid state

PHYS3551 Introductory solid state physics (6) **PHYS3650** Observational astronomy (6) PHYS3651 The physical universe (6) Principles of astronomy (6) **PHYS3652** Laser and spectroscopy (6) PHYS3750 PHYS3751 Physics of nanomaterials (6) **PHYS3850** Waves and optics (6) Atomic and nuclear physics (6) PHYS3851

PHYS4150 Computational physics (6)
PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)

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PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6) PHYS4653 Cosmology (6)

PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7650	Stellar atmospheres (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requirement (6 credits)		
At least 6 credits selected from the following courses:		

PHYS3999 Directed studies in physics (6) Physics internship (6) **PHYS4966** Physics project (12) PHYS4999

## Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Major Title Major in Physics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
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## Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

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**Disciplinary Core Courses (36 credits)** 

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# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (24 credits)

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# Disciplinary Electives (18 credits)

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PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6) PHYS4653 Cosmology (6)

PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
PHYS7351	Graduate quantum mechanics (6)
PHYS7450	Graduate electromagnetism (6)
PHYS7550	Graduate statistical mechanics (6)
PHYS7551	Graduate solid state physics (6)
PHYS7650	Stellar atmospheres (6)
PHYS7750	Nanophysics (6)
3. Capstone requirement (6 credits)	

At least 6 credits selected from the following courses:

PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

## Remarks:

Major Title Major in Risk Management

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

#### Required courses (96 credits)

#### 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) Statistics: ideas and concepts (6) STAT1600

MATH2014 Multivariable calculus and linear algebra (6)

Probability and statistics I (6) STAT2601 STAT2602 Probability and statistics II (6)

#### 2. Advanced level courses (48 credits)

#### **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6) The statistics of investment risk (6) STAT3609 Practical mathematics for investment (6) STAT3615

STAT4601 Time-series analysis (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

Probability modelling (6) STAT3603

STAT3610 Risk management and insurance (6) STAT3612 Data mining (6)

STAT3618

Derivatives and risk management (6) Financial economics II (6) STAT3911 Current topics in risk management (6) STAT4603

Risk management and Basel Accords in banking and finance STAT4606

(6)

Credit risk analysis (6) STAT4607 STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

Directed studies in statistics (6) STAT3799

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Risk Management

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

## Required courses (96 credits)

#### 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

#### 2. Advanced level courses (48 credits)

#### **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

STAT4601 Time-series analysis (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

STAT3603 Probability modelling (6)

STAT3610 Risk management and insurance (6)

STAT3612 Data mining (6)

STAT3618 Derivatives and risk management (6)
STAT3911 Financial economics II (6)
STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Risk Management

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

#### Required courses (96 credits)

#### 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) Statistics: ideas and concepts (6) STAT1600

MATH2014 Multivariable calculus and linear algebra (6)

Probability and statistics I (6) STAT2601 STAT2602 Probability and statistics II (6)

#### 2. Advanced level courses (48 credits)

#### **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6) The statistics of investment risk (6) STAT3609 Practical mathematics for investment (6) STAT3615

STAT4601 Time-series analysis (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

Probability modelling (6) STAT3603 STAT3610 Risk management and insurance (6)

STAT3612 Data mining (6)

STAT3618

Derivatives and risk management (6) Financial economics II (6) STAT3911 Current topics in risk management (6) STAT4603

Risk management and Basel Accords in banking and finance STAT4606

(6)

Credit risk analysis (6) STAT4607 STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

Directed studies in statistics (6) STAT3799

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Risk Management

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

#### Required courses (96 credits)

#### 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

#### **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

STAT4601 Time-series analysis (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

STAT3603 Probability modelling (6)

STAT3610 Risk management and insurance (6)

STAT3612 Data mining (6) STAT3618 Derivatives and risk management (6)

STAT3911 Financial economics II (6) STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Risk Management

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

#### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
STAT1600 Statistics: ideas and concepts (6)
STAT2601 Probability and statistics II (6)
STAT2602 Probability and statistics II (6)
STAT2603 Data management with SAS (6)

# 2. Advanced level courses (48 credits)

#### **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

STAT4601 Time-series analysis (6)

#### **Disciplinary Electives (24 credits)**

#### At least 24 credits selected from the following courses:

STAT3603 Probability modelling (6)

STAT3610 Risk management and insurance (6)

STAT3612 Data mining (6)

STAT3618 Derivatives and risk management (6) STAT3911 Financial economics II (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Risk Management

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

#### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
STAT1600 Statistics: ideas and concepts (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)
STAT2603 Data management with SAS (6)

# 2. Advanced level courses (48 credits)

#### **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

STAT4601 Time-series analysis (6)

# Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

STAT3603 Probability modelling (6)

STAT3610 Risk management and insurance (6)

STAT3612 Data mining (6)

STAT3618 Derivatives and risk management (6)

STAT3911 Financial economics II (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6)
STAT4608 Market risk analysis (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Statistics

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

#### Required courses (96 credits)

#### 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

#### 2. Advanced level courses (48 credits) Disciplinary Core Courses (24 credits)

STAT3600 Linear statistical analysis (6)
STAT3603 Probability modelling (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

#### **Disciplinary Electives (24 credits)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

List A

STAT3602 Statistical inference (6)

STAT3604 Design and analysis of experiments (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)

List B

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)
STAT3612 Data mining (6)
STAT3613 Marketing engineering (6)
STAT3616 Advanced SAS programming (6)

STAT3617 Sample survey methods (6) STAT3955 Survival analysis (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Statistics

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

#### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

#### **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3603 Probability modelling (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

#### **Disciplinary Electives (24 credits)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

List A

STAT3602 Statistical inference (6)

STAT3604 Design and analysis of experiments (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)

List B

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)
STAT3612 Data mining (6)
STAT3613 Marketing engineering (6)
STAT3616 Advanced SAS programming (6)

STAT3617 Sample survey methods (6) STAT3955 Survival analysis (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Statistics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

#### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3603 Probability modelling (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

#### **Disciplinary Electives (24 credits)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

List A

STAT3602 Statistical inference (6)

STAT3604 Design and analysis of experiments (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)

List B

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)
STAT3612 Data mining (6)
STAT3613 Marketing engineering (6)
STAT3616 Advanced SAS programming (6)

STAT3617 Sample survey methods (6) STAT3955 Survival analysis (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Statistics

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

#### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

**SCNC1111** Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112

**Disciplinary Courses (30 credits)** 

University mathematics II (6) MATH1013 STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) Probability and statistics II (6) STAT2602

# 2. Advanced level courses (48 credits)

#### **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6) STAT3603 Probability modelling (6) STAT4601 Time-series analysis (6) Multivariate data analysis (6) STAT4602

#### **Disciplinary Electives (24 credit)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

List A

Statistical inference (6) STAT3602

STAT3604 Design and analysis of experiments (6) Modern nonparametric statistics (6) STAT3620 STAT3621 Statistical data analysis (6)

List B

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

Statistics in clinical medicine and bio-medical research (6) STAT3607

STAT3608 Statistical genetics (6) STAT3612 Data mining (6) Marketing engineering (6) STAT3613 STAT3616 Advanced SAS programming (6) STAT3617 Sample survey methods (6) STAT3955 Survival analysis (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Statistics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits) Scientific method and reasoning (6) SCNC1111 **SCNC1112** Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) Statistics: ideas and concepts (6) STAT1600 STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

# 2. Advanced level courses (48 credits)

**Disciplinary Core Courses (24 credits)** STAT3600

Linear statistical analysis (6) STAT3603 Probability modelling (6) STAT4601 Time-series analysis (6) Multivariate data analysis (6) STAT4602

#### **Disciplinary Electives (24 credits)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

List A STAT3602 Statistical inference (6)

Design and analysis of experiments (6) STAT3604 STAT3620 Modern nonparametric statistics (6) Statistical data analysis (6) STAT3621

List B

STAT3605 Quality control and management (6)

Business logistics (6) STAT3606

STAT3607 Statistics in clinical medicine and bio-medical research (6)

Statistical genetics (6) STAT3608 STAT3612 Data mining (6) Marketing engineering (6) STAT3613 Advanced SAS programming (6) STAT3616 STAT3617 Sample survey methods (6)

STAT3955 Survival analysis (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Statistics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management Minor in Statistics

# Required courses (96 credits)

1. Introductory level courses (42 credits)	1.	Introductory	level courses	(42 credits)
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# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
STAT1600 Statistics: ideas and concepts (6)
STAT2601 Probability and statistics II (6)
STAT2602 Probability and statistics II (6)
STAT2603 Data management with SAS (6)

# 2. Advanced level courses (48 credits) Disciplinary Core Courses (24 credits)

STAT3600 Linear statistical analysis (6)
STAT3603 Probability modelling (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

#### **Disciplinary Electives (24 credits)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

STAT3602 Statistical inference (6)
STAT3604 Design and analysis of experiments (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)

List B

List A

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)
STAT3612 Data mining (6)
STAT3613 Marketing engineering (6)
STAT3616 Advanced SAS programming (6)
STAT3617 Sample survey methods (6)

STAT3955 Survival analysis (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Science Minors in 2017-18

# SCIENCE

# SECTION VII Science Minors on offer in 2017/18

# Minors offered by Science Faculty

# **Minors** (17)

**Actuarial Studies** 

Astronomy

Biochemistry

Chemistry

Computational & Financial Mathematics

Earth Sciences

Ecology & Biodiversity

**Environmental Science** 

Food & Nutritional Science

Marine Biology

Mathematics

Molecular Biology & Biotechnology

Operations Research & Mathematical Programming

Physics

Plant Science

Risk Management

Statistics

2017

Offered to students

admitted to Year 1 in

#### Objectives:

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

#### 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

#### 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

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STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

2015

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
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STAT2901 Probability and statistics: foundations of actuarial science (6)

#### 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies (6)

STAT3904 Corporate finance for actuarial science (6)

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STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students

2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

# 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies (6)

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STAT3906 Risk theory I (6)

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STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

2013

Offered to students

admitted to Year 1 in

#### Objectives:

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

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STAT2901 Probability and statistics: foundations of actuarial science (6)

#### 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2012

admitted to Year 1 in

#### Objectives:

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
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#### 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

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STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Minor Title Minor in Astronomy

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Astronomy

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

# **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
PHYS2265 Modern physics (6)

# 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks:

Minor Title Minor in Astronomy

Offered to students 2016

admitted to Year 1 in

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

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#### Impermissible Combinations:

Major in Astronomy

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

# **Disciplinary Core Courses (18 credits)**

Fundamental physics (6) PHYS1250 Nature of the universe (6) PHYS1650 **PHYS2265** Modern physics (6)

# 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

Observational astronomy (6) PHYS3650 PHYS3651 The physical universe (6) PHYS3652 Principles of astronomy (6) Stellar physics (6) **PHYS4650** 

Selected topics in astrophysics (6) PHYS4651

Planetary science (6) **PHYS4652** PHYS4653 Cosmology (6) General relativity (6) **PHYS4654** Interstellar medium (6) PHYS4655 **PHYS7650** Stellar atmospheres (6)

#### Notes:

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Minor Title Minor in Astronomy

Offered to students 2015

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Major in Astronomy

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PHYS4653 Cosmology (6)
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PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

#### Notes:

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#### Remarks

Minor Title Minor in Astronomy

Offered to students 2014

admitted to Year 1 in

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#### Impermissible Combinations:

Major in Astronomy

#### Required courses (42 credits)

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PHYS4654 General relativity (6)

PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

#### Notes:

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#### Remarks:

Minor Title Minor in Astronomy

Offered to students 2013

admitted to Year 1 in

#### Objectives:

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

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By the end of this programme, students should be able to:

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- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Astronomy

### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

### **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
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## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

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#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

Minor Title Minor in Astronomy

Offered to students 2012

admitted to Year 1 in

#### Objectives:

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Astronomy

### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

### **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
PHYS2265 Modern physics (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

2017

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

#### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: Perspectives in biochemistry (6) BIOC1600 From molecules to cells (6) BIOL1110

BIOC2600 Basic biochemistry (6)

this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually exclusive.

**BIOL2220** Principles of biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

Take either BIOC2600 or BIOL2220 to fulfill

exclusive.

#### 2. Advanced level courses (24 credits) **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

**BIOC3605** Sequence bioinformatics (6) Molecular medicine (6) **BIOC3606** Nutritional biochemistry (6) BIOL3202 BIOL3401 Molecular biology (6)

Cell biology and cell technology (6) **BIOL3402** 

**BIOL3403** Immunology (6)

BIOL3404 Protein structure and function (6) BIOC4610 Advanced biochemistry (6) BIOC4612 Molecular biology of the gene (6)

Advanced techniques in biochemistry & molecular biology (6) **BIOC4613** 

**BIOL4417** 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students

2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

**BIOL2220** 

### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: BIOC1600 Perspectives in biochemistry (6) From molecules to cells (6) BIOL1110

BIOC2600 Basic biochemistry (6)

Principles of biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both.

BIOC2600 and BIOL2220 are mutually exclusive.

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually exclusive.

#### 2. Advanced level courses (24 credits) **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

**BIOC3605** Sequence bioinformatics (6) Molecular medicine (6) **BIOC3606** BIOL3202 Nutritional biochemistry (6) BIOL3401 Molecular biology (6)

Cell biology and cell technology (6) **BIOL3402** 

Immunology (6) BIOL3403

Protein structure and function (6) BIOL3404 BIOC4610 Advanced biochemistry (6) BIOC4612 Molecular biology of the gene (6)

Advanced techniques in biochemistry & molecular biology (6) **BIOC4613** 

**BIOL4417** 'Omics' and systems biology (6)

Chemical biology (6) CHEM4444

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses

### Remarks:

Offered to students

2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)

BIOC2600 Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both.

BIOC2600 and BIOL2220 are mutually exclusive.

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually exclusive.

## 2. Advanced level courses (24 credits)

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses: BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)
BIOC3605 Sequence bioinformatics (6)

BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)
BIOC4610 Advanced biochemistry (6)
BIOC4612 Molecular biology of the gene (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

BIOL4417 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

BIOC3601

#### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
BIOC2600 Basic biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)
BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3403 Immunology (6)
BIOL3404 Protein structure and function (6)
BIOC4610 Advanced biochemistry (6)
BIOC4612 Molecular biology of the gene (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

BIOL4417 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

#### Notes:

### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
BIOC2600 Basic biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOC3601 Basic metabolism (6) BIOC3604 Essential techniques in biochemistry and molecular biology (6) BIOC3605 Sequence bioinformatics (6) Molecular medicine (6) **BIOC3606** BIOL3202 Nutritional biochemistry (6) Molecular biology (6) BIOL3401 BIOL3402 Cell biology and cell technology (6) BIOL3403 Immunology (6) Protein structure and function (6) BIOL3404 **BIOC4610** Advanced biochemistry (6) Molecular biology of the gene (6) BIOC4612 BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

BIOL4417 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

BIOC2600

### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOC3601 Basic metabolism (6)

Basic biochemistry (6)

BIOC3601 BIOC3604 Essential techniques in biochemistry and molecular biology (6) BIOC3605 Sequence bioinformatics (6) Molecular medicine (6) **BIOC3606** BIOL3202 Nutritional biochemistry (6) Molecular biology (6) BIOL3401 BIOL3402 Cell biology and cell technology (6) BIOL3403 Immunology (6) Protein structure and function (6) BIOL3404

BIOL3403 Immunology (6)
BIOL3404 Protein structure and function (6)
BIOC4610 Advanced biochemistry (6)
BIOC4612 Molecular biology of the gene (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

BIOL4417 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

#### Notes:

### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the

curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based

learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

### Required courses (42 credits)

## 1. Introductory level courses (24 credits)

### **Disciplinary Core Courses (12 credits)**

CHEM1042 General chemistry I (6) CHEM1043 General chemistry II (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

CHEM2241 Analytical chemistry I (6) CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2541 Introductory physical chemistry (6)

2. Advanced level courses (18 credits)

### **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM4543

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) CHEM3143 Introduction to materials chemistry (6)

CHEM3146 Principles and applications of spectroscopic and

analytical techniques (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

CHEM3243 Introductory instrumental chemical analysis (6)
CHEM3244 Analytical techniques for pharmacy students (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3342 Bioinorganic chemistry (6)
CHEM3441 Organic chemistry II (6)

CHEM3442 Organic chemistry of biomolecules (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6) CHEM3542 Physical chemistry: statistical thermodynamics and

kinetics theory (6)

CHEM3999 Directed studies in chemistry (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)

CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)
CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)

CHEM4544 Electrochemical science and technology (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates:

Advanced physical chemistry (6)

HKUtopia (6)

CHEM4966	Chemistry internship (6)
CHEM4999	Chemistry project (12)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

### Required courses (42 credits)

### 1. Introductory level courses (24 credits)

### Disciplinary Core Courses (12 credits)

CHEM1042 General chemistry I (6) CHEM1043 General chemistry II (6)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

CHEM2041 Principles of chemistry (6)

CHEM2241 Analytical chemistry I (6)

CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2541 Introductory physical chemistry (6)
2. Advanced level courses (18 credits)

### Disciplinary Electives (18 credits)

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6)
CHEM3143 Introduction to materials chemistry (6)

CHEM3146 Principles and applications of spectroscopic and

analytical techniques (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

CHEM3243 Introductory instrumental chemical analysis (6)
CHEM3244 Analytical techniques for pharmacy students (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3342 Bioinorganic chemistry (6)
CHEM3441 Organic chemistry II (6)

CHEM3442 Organic chemistry of biomolecules (6) CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)
CHEM3542 Physical chemistry: statistical thermodynamics and

kinetics theory (6)

CHEM3999 Directed studies in chemistry (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)

CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911

Capstone experience for chemistry undergraduates:

HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

### Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

### Required courses (42 credits)

### 1. Introductory level courses (24 credits)

### Disciplinary Core Courses (12 credits)

General chemistry I (6) CHEM1042 CHEM1043 General chemistry II (6)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: CHEM2041 Principles of chemistry (6) Analytical chemistry I (6) CHEM2241 CHEM2341 Inorganic chemistry I (6) CHEM2441 Organic chemistry I (6)

CHEM2441 and CHEM2442 are mutually

exclusive

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually

exclusive. Introductory physical chemistry (6)

### 2. Advanced level courses (18 credits)

#### **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM2541

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) Introduction to materials chemistry (6) CHFM3143

Principles and applications of spectroscopic and CHEM3146

analytical techniques (6)

Analytical chemistry II: chemical instrumentation (6) CHEM3241

CHEM3242 Food and water analysis (6)

Introductory instrumental chemical analysis (6) CHEM3243 CHEM3244 Analytical techniques for pharmacy students (6)

Inorganic chemistry II (6) CHFM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

Organic chemistry of biomolecules (6) CHEM3442 CHEM3443 Organic chemistry laboratory (6)

Integrated laboratory (6) CHEM3445

Physical chemistry: Introduction to quantum chemistry (6) CHEM3541 Physical chemistry: statistical thermodynamics and CHEM3542

kinetics theory (6)

Directed studies in chemistry (6) CHEM3999

Symmetry, group theory and applications (6) CHEM4142 CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6) Medicinal chemistry (6) CHEM4145 Supramolecular chemistry (6) CHEM4147

Modern chemical instrumentation and applications (6) CHEM4241

CHEM4242 Analytical chemistry (6)

Advanced inorganic chemistry (6) CHFM4341 Organometallic chemistry (6) CHEM4342 Advanced organic chemistry (6) CHEM4441 Integrated organic synthesis (6) CHEM4443

CHEM4444 Chemical biology (6) CHEM4542 Computational chemistry (6) Advanced physical chemistry (6) CHEM4543

Electrochemical science and technology (6) CHEM4544 CHEM4910 Chemistry literacy and research (6)

CHEM4911

Capstone experience for chemistry undergraduates:

HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

### Remarks:

Offered to students

2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

### Required courses (42 credits)

### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

General chemistry I (6) CHEM1042 I previous title: General chemistry (6) 1

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

Principles of chemistry (6) CHEM2041 CHEM2241 Analytical chemistry I (6) Inorganic chemistry I (6) CHEM2341 CHEM2441 Organic chemistry I (6)

CHEM2441 and CHEM2442 are mutually exclusive. CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually exclusive.

Introductory physical chemistry (6) [ previous title: Physical chemistry I (6) ] CHEM2541

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) Introduction to materials chemistry (6) CHEM3143 CHEM3146 Principles and applications of spectroscopic and

analytical techniques (6)

Analytical chemistry II: chemical instrumentation CHEM3241

CHEM3242 Food and water analysis (6)

Introductory instrumental chemical analysis (6) CHEM3243 CHEM3244 Analytical techniques for pharmacy students (6)

Inorganic chemistry II (6) CHFM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

Organic chemistry of biomolecules (6) CHEM3442 CHEM3443 Organic chemistry laboratory (6) Integrated laboratory (6) CHFM3445

Physical chemistry: Introduction to quantum CHEM3541

chemistry (6)

Physical chemistry: statistical thermodynamics CHEM3542

and kinetics theory (6)

CHEM3999 Directed studies in chemistry (6)

Symmetry, group theory and applications (6) CHEM4142 Interfacial science and technology (6) CHEM4143

CHEM4144 Advanced materials (6) **CHEM4145** Medicinal chemistry (6) Supramolecular chemistry (6) CHEM4147 Modern chemical instrumentation and CHEM4241

applications (6) Analytical chemistry (6) CHEM4242

Advanced inorganic chemistry (6) CHEM4341 CHEM4342 Organometallic chemistry (6) Advanced organic chemistry (6) CHEM4441 Integrated organic synthesis (6) CHEM4443

Chemical biology (6) CHEM4444 Computational chemistry (6) CHEM4542 CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6) Chemistry literacy and research (6) CHEM4910

CHEM4911

[ previous title: Physical chemistry II: Introduction to quantum chemistry (6) 1

Capstone experience for chemistry undergraduates: HKUtopia (6) Chemistry internship (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

### Remarks:

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

2013

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

### Required courses (42 credits)

### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

General chemistry I (6) CHEM1042 I previous title: General chemistry (6) 1

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

Principles of chemistry (6) CHEM2041 CHEM2241 Analytical chemistry I (6) Inorganic chemistry I (6) CHEM2341 CHEM2441 Organic chemistry I (6)

CHEM2441 and CHEM2442 are mutually exclusive. CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually exclusive.

Introductory physical chemistry (6) [ previous title: Physical chemistry I (6) ] CHEM2541

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

[ previous title: Physical chemistry II: Introduction to

quantum chemistry (6) 1

List A CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) Introduction to materials chemistry (6) CHEM3143 CHEM3146 Principles and applications of spectroscopic and

analytical techniques (6)

Analytical chemistry II: chemical instrumentation CHEM3241

CHEM3242 Food and water analysis (6)

Introductory instrumental chemical analysis (6) CHEM3243 CHEM3244 Analytical techniques for pharmacy students (6)

Inorganic chemistry II (6) CHFM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

Organic chemistry of biomolecules (6) CHEM3442 CHEM3443 Organic chemistry laboratory (6) Integrated laboratory (6) CHFM3445

Physical chemistry: Introduction to quantum CHEM3541 chemistry (6)

Physical chemistry: statistical thermodynamics

CHEM3542

and kinetics theory (6) CHEM3999 Directed studies in chemistry (6)

Symmetry, group theory and applications (6) CHEM4142 Interfacial science and technology (6) CHEM4143

CHEM4144 Advanced materials (6) **CHEM4145** Medicinal chemistry (6) Supramolecular chemistry (6) CHEM4147 Modern chemical instrumentation and CHEM4241

applications (6) Analytical chemistry (6) CHEM4242

Advanced inorganic chemistry (6) CHFM4341 CHEM4342 Organometallic chemistry (6) Advanced organic chemistry (6) CHEM4441 Integrated organic synthesis (6) CHEM4443

Chemical biology (6) CHEM4444

Physical chemistry III: statistical thermodynamics CHEM4541

and kinetics theory (6) Computational chemistry (6) CHEM4542 CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6) CHEM4910 Chemistry literacy and research (6)
CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

#### Required courses (42 credits) 1. Introductory level courses (18 credits) **Disciplinary Core Courses (6 credits)** General chemistry I (6) CHEM1042 I previous title: General chemistry (6) 1 **Disciplinary Electives (12 credits)** At least 12 credits selected from the following courses:

Principles of chemistry (6) CHEM2041 CHEM2241 Analytical chemistry I (6) Inorganic chemistry I (6) CHEM2341 CHEM2441 Organic chemistry I (6)

CHEM2441 and CHEM2442 are mutually exclusive. CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually exclusive. Introductory physical chemistry (6) [ previous title: Physical chemistry I (6) ] CHEM2541

2. Advanced level courses (24 credits)

**Disciplinary Electives (24 credits)** 

At least 24 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

[ previous title: Physical chemistry II: Introduction to

quantum chemistry (6) 1

List A CHEM3141 Environmental chemistry (6) CHEM3142 Chemical process industries and analysis (6) Introduction to materials chemistry (6) CHEM3143 CHEM3146 Principles and applications of spectroscopic and analytical techniques (6) Analytical chemistry II: chemical instrumentation CHEM3241

CHEM3242 Food and water analysis (6)

Introductory instrumental chemical analysis (6) CHEM3243 CHEM3244 Analytical techniques for pharmacy students (6)

Inorganic chemistry II (6) CHFM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

Organic chemistry of biomolecules (6) CHEM3442 CHEM3443 Organic chemistry laboratory (6) Integrated laboratory (6) CHFM3445

Physical chemistry: Introduction to quantum CHEM3541

chemistry (6)

Physical chemistry: statistical thermodynamics CHEM3542

and kinetics theory (6) CHEM3999 Directed studies in chemistry (6)

Symmetry, group theory and applications (6) CHEM4142 Interfacial science and technology (6) CHEM4143

CHEM4144 Advanced materials (6) **CHEM4145** Medicinal chemistry (6) Supramolecular chemistry (6) CHEM4147 Modern chemical instrumentation and CHEM4241

applications (6) Analytical chemistry (6) CHEM4242 Advanced inorganic chemistry (6) CHFM4341

CHEM4342 Organometallic chemistry (6) Advanced organic chemistry (6) CHEM4441 Integrated organic synthesis (6) CHEM4443

Chemical biology (6) CHEM4444

Physical chemistry III: statistical thermodynamics CHEM4541 and kinetics theory (6)

Computational chemistry (6) CHEM4542 CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6) CHEM4910 Chemistry literacy and research (6)
CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Minor Title Minor in Computational & Financial Mathematics

Offered to students 2017

admitted to Year 1 in

#### Objectives:

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and projectbased learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

### Required courses (42 credits)

## 1. Introductory level courses (18 credits) (note 3)

### **Disciplinary Core Courses (18 credits)**

MATH1013 University mathematics II (6) Linear algebra I (6) MATH2101 MATH2211 Multivariable calculus (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Core Courses (12 credits)**

Numerical analysis (6) MATH3601 MATH3906 Financial calculus (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

Computational methods and differential equations with MATH3408 applications (6)

MATH3603 Probability theory (6) Introduction to optimization (6) MATH3904 Game theory and strategy (6) MATH3911 MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6) Topics in financial mathematics (6) MATH7217 **MATH7224** 

Topics in advanced probability theory (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Minor Title Minor in Computational & Financial Mathematics

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

### Required courses (42 credits)

## 1. Introductory level courses (18 credits) (note 3)

### **Disciplinary Core Courses (18 credits)**

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Core Courses (12 credits)**

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with applications (6)

MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)
MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7217 Topics in financial mathematics (6)
MATH7224 Topics in advanced probability theory (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks

Minor Title Minor in Computational & Financial Mathematics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

### Required courses (42 credits)

### 1. Introductory level courses (18 credits) (note 3)

### Disciplinary Core Courses (18 credits)

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

## 2. Advanced level courses (24 credits)

## Disciplinary Core Courses (12 credits)

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6)
MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)
MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)

#### Notes

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Minor Title Minor in Computational & Financial Mathematics

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and projectbased learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (42 credits)

### 1. Introductory level courses (18 credits) (note 3)

### Disciplinary Core Courses (18 credits)

MATH1013 University mathematics II (6) MATH2101 Linear algebra I (6) Multivariable calculus (6) MATH2211

# 2. Advanced level courses (24 credits)

### **Disciplinary Core Courses (12 credits)**

MATH3601 Numerical analysis (6) Financial calculus (6) **MATH3906** 

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6) MATH3603 Probability theory (6) MATH3904 Introduction to optimization (6) Game theory and strategy (6) MATH3911 Scientific computing (6) MATH4602

MATH4907 Numerical methods for financial calculus (6)

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Minor Title Minor in Computational & Financial Mathematics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (42 credits)

### 1. Introductory level courses (18 credits) (note 3)

### Disciplinary Core Courses (18 credits)

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (24 credits)

## Disciplinary Core Courses (12 credits)

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6)
MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)
MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)

#### Notes

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Minor Title Minor in Computational & Financial Mathematics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics Minor in Mathematics

## Required courses (42 credits)

#### 1. Introductory level courses (18 credits) (note 3)

### **Disciplinary Core Courses (18 credits)**

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

### 2. Advanced level courses (24 credits)

#### **Disciplinary Core Courses (12 credits)**

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6)
MATH3603 Probability theory (6)

MATH3904 Introduction to optimization (6)
MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-reg.

#### Remarks:

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: Blue Planet (6) EASC1401 EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

requirement rine content co	
List A	
EASC3020	Global change: anthropogenic impacts (6)
EASC3402	Petrology (6)
EASC3403	Sedimentary environments (6)
EASC3404	Structural geology (6)
EASC3405	Environmental remote sensing (6)
EASC3406	Reconstruction of past climate (6)
EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)
EASC3410	Hydrogeology (6)

EASC3412 Earth resources (6) Engineering geology (6) EASC3413 EASC3414 Soil and rock mechanics (6) Meteorology (6) EASC3415

EASC3416

Advanced geochemistry and geochronology (6) Earth through time (6) EASC3417

Directed studies in earth sciences (6) EASC3999

EASC4403 Biogeochemical cycles (6) Earth dynamics & global tectonics (6) EASC4406 EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6) EASC4911 Earth system: contemporary issues (6) EASC4955 Integrated field studies (6) EASC4966 Earth sciences internship (6)

**EASC4999** Earth sciences project (12)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

## Remarks:

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC1401 Blue Planet (6)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A	
EASC3020	Global change: anthropogenic impacts (6)
EASC3402	Petrology (6)
EASC3403	Sedimentary environments (6)
EASC3404	Structural geology (6)
EASC3405	Environmental remote sensing (6)
EASC3406	Reconstruction of past climate (6)
EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3415 Meteorology (6)

EASC3416 Advanced geochemistry and geochronology (6)
EASC3417 Earth through time (6)

EASC3917 East tillough tille (b)
EASC3999 Directed studies in earth sciences (6)

EASC4403 Biogeochemical cycles (6)
EASC4406 Earth dynamics & global tectonics (6)
EASC4407 Regional geology (6)

EASC4407

EASC4408

Special topics in earth sciences (6)

EASC4911

Earth system: contemporary issues (6)

EASC4955

Integrated field studies (6)

EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)
EASC4999 Earth sciences project (12)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC1401 Blue Planet (6)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A		
EASC3020	Global change: anthropogenic impacts (6)	
EASC3402	Petrology (6)	
EASC3403	Sedimentary environments (6)	
EASC3404	Structural geology (6)	
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EASC3406	Reconstruction of past climate (6)	
EASC3408	Geophysics (6)	
EASC3409	Igneous and metamorphic petrogenesis (6)	
FASC3410	Hydrogeology (6)	

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)
EASC3415 Meteorology (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)
EASC3999 Directed studies in earth sciences (6)

EASC3999 Directed studies in earth so EASC4403 Biogeochemical cycles (6)

EASC4406 Earth dynamics & global tectonics (6)
EASC4407 Regional geology (6)
EASC4408 Special topics in earth sciences (6)

EASC4408 Special topics in earth sciences (6)
EASC4911 Earth system: contemporary issues (6)
EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)

### Notes:

**EASC4999** 

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Earth sciences project (12)

## Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC1401 Blue Planet (6)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A	
EASC3020	Global change: anthropogenic impacts (6)
EASC3402	Petrology (6)
EASC3403	Sedimentary environments (6)
EASC3404	Structural geology (6)
EASC3405	Environmental remote sensing (6)
EASC3406	Reconstruction of past climate (6)
EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)
EASC3410	Hydrogeology (6)
EACC2442	Earth resources (6)

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)
EASC3415 Meteorology (6)

EASC3416 Advanced geochemistry and geochronology (6)
EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)

EASC4403 Biogeochemical cycles (6)

EASC4406 Earth dynamics & global tectonics (6)
EASC4407 Regional geology (6)
EASC4408 Special topics in earth sciences (6)

EASC4911 Earth system: contemporary issues (6)
EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)
EASC4999 Earth sciences project (12)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

## Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

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- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC1401 Blue Planet (6)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

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EASC3403	Sedimentary environments (6)
EASC3404	Structural geology (6)
EASC3405	Environmental remote sensing (6)
EASC3406	Reconstruction of past climate (6)
EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3414 Soil and rock me EASC3415 Meteorology (6)

EASC3416 Advanced geochemistry and geochronology (6)
EASC3417 Earth through time (6)

EASC3917 East tillough tille (b)
EASC3999 Directed studies in earth sciences (6)

EASC4403 Biogeochemical cycles (6)
EASC4406 Earth dynamics & global tectonics (6)
FASC4407 Regional geology (6)

EASC4407 Regional geology (6)
EASC4408 Special topics in earth sciences (6)
EASC4911 Earth system: contemporary issues (6)

EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)
EASC4999 Earth sciences project (12)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

## Remarks:

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC1401 Blue Planet (6)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

Global change: anthropogenic impacts (6)
Petrology (6)
Sedimentary environments (6)
Structural geology (6)
Environmental remote sensing (6)
Reconstruction of past climate (6)
Geophysics (6)
Igneous and metamorphic petrogenesis (6)
Hydrogeology (6)

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)
EASC3415 Meteorology (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
EASC4403 Biogeochemical cycles (6)

EASC4406 Earth dynamics & global tectonics (6)
EASC4407 Regional geology (6)
EASC4408 Special topics in earth sciences (6)

EASC4960 Special topics in earth sciences (b)
EASC4911 Earth system: contemporary issues (6)
EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)

### Notes:

**EASC4999** 

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Earth sciences project (12)

## Remarks:

Minor Title Minor in Ecology & Biodiversity

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

### Impermissible Combinations:

Major in Ecology & Biodiversity

### Required courses (36 credits)

#### 1. Introductory level courses (12 credits) **Disciplinary Core Courses (12 credits)**

Evolutionary diversity (6) BIOL1309 BIOL2306 Ecology and evolution (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

BIOL3101	Animal behaviour (6)
BIOL3301	Marine biology (6)
BIOL3302	Systematics and phylogenetics (6)
BIOL3303	Conservation biology (6)
BIOL3313	Freshwater ecology (6)
BIOL3314	Plant structure and evolution (6)
BIOL3318	Experimental intertidal ecology (6)
BIOL3319	Tropical terrestrial ecology (6)
BIOL3419	Insect ecology: the little things that run the world (6)
BIOL4301	Fish and fisheries (6)
BIOI 4302	Environmental impact assessment (6)

#### Notes:

### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

Minor Title Minor in Ecology & Biodiversity

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

### Impermissible Combinations:

Major in Ecology & Biodiversity

wajor in Ecology & B	lodiversity	
Required course	s (36 credits)	
1. Introductory lev	vel courses (12 credits)	
Disciplinary Core	Courses (12 credits)	
BiOL1309	Evolutionary diversity (6)	
BIOL2306	Ecology and evolution (6)	
2. Advanced level	courses (24 credits)	
Disciplinary Elect	ives (24 credits)	
BIOL3101	Animal behaviour (6)	
BIOL3301	Marine biology (6)	
BIOL3302	Systematics and phylogenetics (6)	
BIOL3303	Conservation biology (6)	[previous title: Conservation ecology (6)]
BIOL3313	Freshwater ecology (6)	
BIOL3314 Plant structure and evolution (6)		
BIOL3318	Experimental intertidal ecology (6)	
BIOL3319	Tropical terrestrial ecology (6)	[previous title: Terrestrail ecology (6) ]
BIOL3320	The biology of marine mammals (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Ecology & Biodiversity

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

### Impermissible Combinations:

Major in Ecology & Bio	odiversity	
Required courses	(36 credits)	
	el courses (12 credits)	
	Courses (12 credits)	
BIOL1309	Evolutionary diversity (6)	
BIOL2306	Ecology and evolution (6)	
2. Advanced level	courses (24 credits)	
Disciplinary Elective		
BIOL3101	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL3301	Marine biology (6)	
BIOL3302	Systematics and phylogenetics (6)	
BIOL3303	Conservation biology (6)	[previous title: Conservation ecology (6) ]
BIOL3313	Freshwater ecology (6)	
BIOL3314	Plant structure and evolution (6)	
BIOL3318	Experimental intertidal ecology (6)	
BIOL3319	Tropical terrestrial ecology (6)	[previous title: Terrestrial ecology (6) ]
BIOL3320	The biology of marine mammals (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.

### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Ecology & Biodiversity

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

### Impermissible Combinations:

Major in Ecology & Biodiversity		
Required courses (36 credits)		
1. Introductory level courses (12 credits) Disciplinary Core Courses (12 credits)		
BIOL1309 Evolutionary diversity (6)		
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2. Advanced level courses (24 credits)		
Disciplinary Electives (24 credits)		
BIOL3101 Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.	
BIOL3301 Marine biology (6)		
BIOL3302 Systematics and phyloger	netics (6)	
BIOL3303 Conservation biology (6)	[previous title: Conservation ecology (6) ]	
BIOL3313 Freshwater ecology (6)		
BIOL3314 Plant structure and evolut	ion (6)	
BIOL3318 Experimental intertidal eco	ology (6)	
BIOL3319 Tropical terrestrial ecology	(6) [previous title: Terrestrial ecology (6)]	
BIOL3320 The biology of marine ma	mmals (6)	
BIOL3419 Insect ecology: the little th	ings that run the world (6)	
BIOL4301 Fish and fisheries (6)		
BIOL4302 Environmental impact ass	essment (6)	
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### Notes:

#### Remarks:

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Minor Title Minor in Ecology & Biodiversity

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
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- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

## Impermissible Combinations:

Major in Ecology & Bio	odiversity	
Required courses	s (36 credits)	
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BIOL1309	Evolutionary diversity (6)	
BIOL2306	Ecology and evolution (6)	
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Disciplinary Electi	ves (24 credits)	
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BIOL3302	Systematics and phylogenetics (6)	
BIOL3303	Conservation biology (6)	[previous title: Conservation ecology (6)]
BIOL3313	Freshwater ecology (6)	
BIOL3314	Plant structure and evolution (6)	
BIOL3318	Experimental intertidal ecology (6)	
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## Remarks:

Minor Title Minor in Ecology & Biodiversity

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

## Impermissible Combinations:

Major in Ecology & Bio	odiversity	
Required courses	s (36 credits)	
	rel courses (12 credits) Courses (12 credits)	
BIOL1309	Evolutionary diversity (6)	
BIOL2306	Ecology and evolution (6)	
2. Advanced level	courses (24 credits)	
Disciplinary Electi	ves (24 credits)	
BIOL3101	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
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BIOL3302	Systematics and phylogenetics (6)	
BIOL3303	Conservation biology (6)	[previous title: Conservation ecology (6)]
BIOL3313	Freshwater ecology (6)	
BIOL3314	Plant structure and evolution (6)	
BIOL3318	Experimental intertidal ecology (6)	
BIOL3319	Tropical terrestrial ecology (6)	[previous title: Terrestrial ecology (6) ]
BIOL3320	The biology of marine mammals (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.

## Notes:

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

2017

Offered to students

admitted to Year 1 in

## **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

## Impermissible Combinations:

Major in Environmental Science

## Required courses (42 credits)

### 1. Introductory level courses (18 credits)

## **Disciplinary Core Courses (6 credits)**

Introduction to environmental science (6) ENVS1401

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

General chemistry I (6) CHEM1042 CHEM2041 Principles of chemistry (6) Analytical chemistry I (6) CHFM2241

CHEM2442 Fundamentals of organic chemistry (6) EASC1020 Introduction to climate science (6)

Blue Planet (6) EASC1401

EASC2404 Introduction to atmosphere and hydrosphere (6)

Environmental life science (6) ENVS1301 ENVS2001 Methods in environmental science (6) ENVS2002 Environmental data analysis (6)

# 2. Advanced level courses (24 credits)

## **Disciplinary Core Courses (6 credits)**

Environment, society and economics (6) FNVS3004

## **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

Environmental toxicology (6) BIOL3110 **BIOL3303** Conservation biology (6)

Environmental impact assessment (6) **BIOI 4302** 

Environmental chemistry (6) CHEM3141

Analytical chemistry II: chemical instrumentation (6) CHEM3241

Food and water analysis (6) CHEM3242

EASC3020 Global change: anthropogenic impacts (6) Environmental remote sensing (6) FASC3405 ENVS3006 Environmental radiation (6)

Natural hazards and mitigation (6) ENVS3007 ENVS3010 Sustainable energy and environment (6) ENVS3019 Urban ecology (6)

ENVS3020

Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) Environmental remediation (6) ENVS4110

## Notes:

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

2016

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

## Impermissible Combinations:

Major in Environmental Science

## Required courses (42 credits)

### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)
CHEM2041 Principles of chemistry I (6)
CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)
EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

# 2. Advanced level courses (24 credits)

## **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

## Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)
EASC3020 Global change: anthropogenic impacts (6)

EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)

ENVS3010 Sustainable energy and environment (6)
ENVS3019 Urban ecology (6)
ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

## Notes:

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

## Impermissible Combinations:

Major in Environmental Science

## Required courses (42 credits)

### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

Introduction to environmental science (6) ENVS1401

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

General chemistry I (6) CHEM1042 CHEM2041 Principles of chemistry (6) Analytical chemistry I (6) CHFM2241

CHEM2442 Fundamentals of organic chemistry (6) EASC1020 Introduction to climate science (6)

Blue Planet (6) EASC1401

EASC2404 Introduction to atmosphere and hydrosphere (6)

Environmental life science (6) ENVS1301 ENVS2001 Methods in environmental science (6) ENVS2002 Environmental data analysis (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (6 credits)**

Environment, society and economics (6) FNVS3004

## **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

Environmental toxicology (6) **BIOI 3110 BIOL3303** Conservation biology (6)

Environmental impact assessment (6) **BIOI 4302** 

Environmental chemistry (6) CHEM3141 Analytical chemistry II: chemical instrumentation (6) CHEM3241

Food and water analysis (6)

CHEM3242 EASC3020 Global change: anthropogenic impacts (6)

Environmental remote sensing (6) FASC3405 ENVS3006 Environmental radiation (6) Natural hazards and mitigation (6) ENVS3007 ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) Environmental remediation (6) ENVS4110

## Notes:

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

2014

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

## Impermissible Combinations:

Major in Environmental Science

## Required courses (42 credits)

### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)
CHEM2041 Principles of chemistry I (6)
CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)
EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

## Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6) BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)

ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)
ENVS3019 Urban ecology (6)

ENVS3019 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

## Notes:

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

## Impermissible Combinations:

Major in Environmental Science

## Required courses (42 credits)

### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)
CHEM2041 Principles of chemistry I (6)
CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)
EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

# 2. Advanced level courses (24 credits)

## **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

## Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)

ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)
ENVS3019 Urban ecology (6)

ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

## Notes:

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

## Impermissible Combinations:

Major in Environmental Science

## Required courses (42 credits)

### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

## **Disciplinary Electives (12 credits)**

At least 6 credits selected from the following courses (Level 1) in List A:

List A

CHEM1042 General chemistry I (6) EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6)

At least 6 credits selected from the following courses (Level 2) in List B:

List B

BIOL2102 Biostatistics (6)
CHEM2041 Principles of chemistry (6)

CHEM2041 Finishes of chemistry (6)
CHEM2041 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)
EASC2404 Introduction to atmosphere and hydrosphere (6)
ENVS2001 Methods in environmental science (6)

ENVS2001 Metriods in environmental science (6)
ENVS2002 Environmental data analysis (6)

# 2. Advanced level courses (24 credits)

## **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

# Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6) BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)
EASC3020 Global change: anthropogenic impacts (6)

EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

## Notes:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Food & Nutritional Science

Offered to students

2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

## Impermissible Combinations:

Major in Food & Nutritional Science

### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6) Introduction to food and nutrition (6) BIOL1201 Principles of food chemistry (6) BIOL2101

Principles of biochemistry (6) BIOL2220

BIOC2600 Basic biochemistry (6) Take either BIOL2220 or BIOC2600 o fulfill this 12 credits requirement, but not both.

BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 o fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive

### 2. Advanced level courses (24 credits) **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses: BIOL3202 Nutritional biochemistry (6)

DIOLOLOL	
BIOL3203	Food microbiology (6)
BIOL3204	Nutrition and the life cycle (6)
BIOL3205	Human physiology (6)
BIOL3206	Clinical nutrition (6)
BIOL3207	Food and nutritional toxicology (6)
BIOL3209	Food and nutrient analysis (6)
BIOL3211	Nutrigenomics (6)
BIOL3216	Food waste management (6)
BIOL3217	Food, environment and health (6)
BIOL3218	Food hygiene and quality control (6)
BIOL4201	Public health nutrition (6)
BIOL4202	Nutrition and sports performance (6)
BIOL4204	Diet, brain function and behavior (6)
BIOL4205	Food processing and engineering (6)
BIOL4208	Meat, dairy and grain sciences (6)
BIOL4209	Functional foods (6)
BIOL4411	Plant and food biotechnology (6)

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

## Remarks:

Minor Title Minor in Food & Nutritional Science

Offered to students

2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

### Impermissible Combinations:

Major in Food & Nutritional Science

BIOL4209

Functional foods (6)

Danisa da assessa	- (00 dit-)	
Required courses		
1. Introductory lev	rel courses (12 credits)	
Disciplinary Electi	ives (12 credits)	
At least 12 credi	ts selected from the following courses:	
BIOL1110	From molecules to cells (6)	
BIOL1201	Introduction to food and nutrition (6)	
BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
BIOLEZZZO	· ····opies or brosinerineary (e)	this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
		exclusive.
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
		this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
		exclusive.
	courses (24 credits)	
Disciplinary Electi		
At least 24 credi	ts selected from the following courses:	
BIOL3201	Food chemistry (6)	
BIOL3202	Nutritional biochemistry (6)	
BIOL3203	Food microbiology (6)	
BIOL3204	Nutrition and the life cycle (6)	
BIOL3205	Human physiology (6)	
BIOL3206	Clinical nutrition (6)	
BIOL3207	Food and nutritional toxicology (6)	
BIOL3208	Food safety and quality management (6)	Take either BIOL3208 or BIOL3218 to fulfill
Biologo	· · · · · · · · · · · · · · · · · · ·	this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
		exclusive.
BIOL3209	Food and nutrient analysis (6)	
BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill
		this 24 credits requirement, but not both.
		BIOL3210 and BIOL4208 are mutually
		exclusive.
BIOL3211	Nutrigenomics (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill
		this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
DIOI 4004	Dublic health mutuition (C)	exclusive.
BIOL4201	Public health nutrition (6)	
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food processing and engineering (6)	
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fulfill
		this 24 credits requirement, but not both.
		BIOL4207 and BIOL4208 are mutually
DIOI 4200	Meat, dairy and grain sciences (6)	exclusive. Take either BIOL3210 or BIOL4208;
BIOL4208	ivical, daily and grain sciences (0)	BIOL4207 or BIOL4208 to fulfill this 24
		credits requirement, but not both. BIOL3210
		and BIOL4207; BIOL4207 and BIOL4208 are
		mutually avaluates

mutually exclusive

BIOL4210	Food product development (6)
BIOL4411	Plant and food biotechnology (6)

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Food & Nutritional Science

Offered to students

2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

### Impermissible Combinations:

Major in Food & Nutritional Science

BIOL4209

Functional foods (6)

		(00 and disc)	
II .	Required courses		
	1. Introductory level	l courses (12 credits)	
	Disciplinary Elective	es (12 credits)	
	At least 12 credits	selected from the following courses:	
	BIOL1110	From molecules to cells (6)	
	BIOL1201	Introduction to food and nutrition (6)	
	BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
	DIOLLLLO	· ·····• p····· · · · · · · · · · · · ·	this 12 credits requirement, but not both.
			BIOL2220 and BIOC2600 are mutaully
			exclusive.
	BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
			this 12 credits requirement, but not both.
			BIOL2220 and BIOC2600 are mutaully
			exclusive.
	2. Advanced level co		
	Disciplinary Elective		
	At least 24 credits	selected from the following courses:	
	BIOL3201	Food chemistry (6)	
	BIOL3202	Nutritional biochemistry (6)	
	BIOL3203	Food microbiology (6)	
	BIOL3204	Nutrition and the life cycle (6)	
	BIOL3205	Human physiology (6)	
	BIOL3206	Clinical nutrition (6)	
	BIOL3207	Food and nutritional toxicology (6)	
	BIOL3208	Food safety and quality management (6)	Take either BIOL3208 or BIOL3218 to fulfill
	2.020200	3	this 24 credits requirement, but not both.
			BIOL3208 and BIOL3218 are mutaully
			exclusive.
	BIOL3209	Food and nutrient analysis (6)	
	BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill
			this 24 credits requirement, but not both.
			BIOL3210 and BIOL4208 are mutaully
	DIOI 0044	Nutrino a series (O)	exclusive.
	BIOL3211	Nutrigenomics (6)	
	BIOL3216	Food waste management (6)	
	BIOL3217	Food, environment and health (6)	
	BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill
			this 24 credits requirement, but not both.
			BIOL3208 and BIOL3218 are mutaully exclusive.
	BIOL4201	Public health nutrition (6)	exclusive.
	BIOL4201 BIOL4202	Nutrition and sports performance (6)	
	BIOL4202 BIOL4204	Diet, brain function and behavior (6)	
	BIOL4205	Food processing and engineering (6)	T-1 :::: :: BIOL 4007 - :: BIOL 4000 t- 5:::::!!
	BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fulfill
			this 24 credits requirement, but not both. BIOL4207 and BIOL4208 are mutaully
			exclusive.
	BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208;
	DIOLAZOO	,, g (o)	BIOL4207 or BIOL4208 to fulfill this 24
			credits requirement, but not both. BIOL3210
			and BIOL4208; BIOL4207 and BIOL4208 are
П			mutaully avaluation

mutaully exclusive

BIOL4210	Food product development (6)
BIOL4411	Plant and food biotechnology (6)

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Food & Nutritional Science

Offered to students

2014

# admitted to Year 1 in

## Objectives:

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

## Impermissible Combinations:

BIOL4209

Functional foods (6)

Major in Food & Nutritional Science

Described assures	- (00 dit-)	
Required courses		
1. Introductory lev	rel courses (12 credits)	
Disciplinary Electi	ives (12 credits)	
At least 12 credit	ts selected from the following courses:	
BIOL1110	From molecules to cells (6)	
BIOL1201	Introduction to food and nutrition (6)	
BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
BIOLEZZO	· ····opies or bissing.iiisuly (s)	this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
		exclusvie.
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
		this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
		exclusvie.
	courses (24 credits)	
Disciplinary Electi		
At least 24 credit	ts selected from the following courses:	
BIOL3201	Food chemistry (6)	
BIOL3202	Nutritional biochemistry (6)	
BIOL3203	Food microbiology (6)	
BIOL3204	Nutrition and the life cycle (6)	
BIOL3205	Human physiology (6)	
BIOL3206	Clinical nutrition (6)	
BIOL3207	Food and nutritional toxicology (6)	
BIOL3208	Food safety and quality management (6)	Take either BIOL3208 or BIOL3218 to fulfill
B.020200	· · · · · · · · · · · · · · · · · · ·	this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
		exclusvie.
BIOL3209	Food and nutrient analysis (6)	
BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill
		this 24 credits requirement, but not both.
		BIOL3210 and BIOL4208 are mutually
DIG. 2244	. (0)	exclusvie.
BIOL3211	Nutrigenomics (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill
		this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
DIOL 4004	Public health nutrition (6)	exclusvie.
BIOL4201	* *	
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food processing and engineering (6)	
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fulfill
		this 24 credits requirement, but not both.
		BIOL3210 and BiOL4208 are mutually exclusvie.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208;
DIOL4200	moat, daily and grain solonocs (o)	BIOL4207 or BIOL4208 to fulfill this 24
		credits requirement, but not both. BIOL3210
		and BIOL4208; BIOL4207 and BIOL4208 are
		must calle analyzaria

mutually exclusvie

BIOL4210	Food product development (6)
BIOL4411	Plant and food biotechnology (6)

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Food & Nutritional Science

Offered to students admitted to Year 1 in 2013

## **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

### Impermissible Combinations:

Major in Food & Nutritional Science

BIOL4209

Functional foods (6)

Danisa danisa	- (00 dit-)	
Required course	· ·	
1. Introductory lev	vel courses (12 credits)	
Disciplinary Elect	ives (12 credits)	
At least 12 credi	its selected from the following courses:	
BIOL1110	From molecules to cells (6)	
BIOL1201	Introduction to food and nutrition (6)	
BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
BIOLEZZO		this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
		exclusive.
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
		this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
	(A. 11/4.)	exclusive.
	courses (24 credits)	
Disciplinary Elect		
	its selected from the following courses:	
BIOL3201	Food chemistry (6)	
BIOL3202	Nutritional biochemistry (6)	
BIOL3203	Food microbiology (6)	
BIOL3204	Nutrition and the life cycle (6)	
BIOL3205	Human physiology (6)	
BIOL3206	Clinical nutrition (6)	
BIOL3207	Food and nutritional toxicology (6)	
BIOL3208	Food safety and quality management (6)	Take either BIOL3208 or BIOL3218 to fulfill
		this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
		exclusive.
BIOL3209	Food and nutrient analysis (6)	
BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill
		this 24 credits requirement, but not both.
		BIOL3210 and BIOL4208 are mutually exclusive.
BIOL3211	Nutrigenomics (6)	exclusive.
BIOL3211	Food waste management (6)	
BIOL3216 BIOL3217	Food, environment and health (6)	
	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill
BIOL3218	rood hygiene and quality control (6)	this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
		exclusive.
BIOL4201	Public health nutrition (6)	
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food processing and engineering (6)	
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fulfill
BIOL-1207	mout and daily colonicos (c)	this 24 credits requirement, but not both.
		BIOL4207 and BIOL4208 are mutually
		exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208;
		BIOL4207 or BIOL4208 to fulfill this 24
		credits requirement, but not both. BIOL3210
		and BIOL4208; BIOL4207 and BIOL4208 are

mutually exclusive

BIOL4210	Food product development (6)
BIOL4411	Plant and food biotechnology (6)

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Food & Nutritional Science

Offered to students

2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

### Impermissible Combinations:

Major in Food & Nutritional Science

BIOL4209

Functional foods (6)

Required course	s (36 credits)	
1. Introductory lev	vel courses (12 credits)	
Disciplinary Elect	,	
	ts selected from the following courses:	
BIOL1110	From molecules to cells (6)	
BIOL1201	Introduction to food and nutrition (6)	
BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
DIOLZZZO	Timopies of biodicinistry (6)	this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
		exclusive.
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
		this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
		exclusive.
	courses (24 credits)	
Disciplinary Elect		
At least 24 credi	its selected from the following courses:	
BIOL3201	Food chemistry (6)	
BIOL3202	Nutritional biochemistry (6)	
BIOL3203	Food microbiology (6)	
BIOL3204	Nutrition and the life cycle (6)	
BIOL3205	Human physiology (6)	
BIOL3206	Clinical nutrition (6)	
BIOL3207	Food and nutritional toxicology (6)	
BIOL3208	Food safety and quality management (6)	Take either BIOL3208 or BIOL3218 to fulfill
		this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
		exclusive.
BIOL3209	Food and nutrient analysis (6)	
BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill
		this 24 credits requirement, but not both.
		BIOL3210 and BIOL4208 are mutually exclusive.
BIOL3211	Nutrigenomics (6)	exclusive.
BIOL3211	Food waste management (6)	
BIOL3216 BIOL3217	Food, environment and health (6)	
		Take either BIOL3208 or BIOL3218 to fulfill
BIOL3218	Food hygiene and quality control (6)	this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
		exclusive.
BIOL4201	Public health nutrition (6)	CAUCHO!
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food processing and engineering (6)	
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fulfill
DIOL+201	Wood and daily colonices (b)	this 24 credits requirement, but not both.
		BIOL4207 and BIOL4208 are mutually
		exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208;
		BIOL4207 or BIOL4208 to fulfill this 24
		credits requirement, but not both. BIOL3210
		and BIOL4208; BIOL4207 and BIOL4208 are

mutually exclusive

BIOL4210	Food product development (6)
BIOL4411	Plant and food biotechnology (6)

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Marine Biology

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g. business, engineering and social science) an excellent opportunity to enter into a career or research in marine environmentrelated fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratorybased, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and projectbased learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratorybased, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

## Required courses (36 credits)

## 1. Introductory level courses (12 credits)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

Evolutionary diversity (6) BIOL1309 Environmental life science (6) ENVS1301 Ecology and evolution (6) **BIOL2306** 

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

BIOL3301 Marine biology (6)

Environmental oceanography (6) **FNVS3313** 

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

Tropical and temperate marine ecology field course (6) BIOL3305

Experimental intertidal ecology (6) BIOL3318 BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

Fish and fisheries (6) BIOL4301

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

## Remarks:

Minor Title Minor in Marine Biology

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g.business, engineering and social science) an excellent opportunity to enter into a career or research in marine environment-related fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NII

## Required courses (36 credits)

## 1. Introductory level courses (12 credits)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)
ENVS1301 Environmental life science (6)
BIOL2306 Ecology and evolution (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

BIOL3301 Marine biology (6)

ENVS3313 Environmental oceanography (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3318 Experimental intertidal ecology (6)
BIOL3320 The biology of marine mammals (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

## Notes:

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Marine Biology

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g.business, engineering and social science) an excellent opportunity to enter into a career or research in marine environment-related fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

## Impermissible Combinations:

NII

## Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)
ENVS1301 Environmental life science (6)
BIOL2306 Ecology and evolution (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

BIOL3301 Marine biology (6)

ENVS3313 Environmental oceanography (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3318 Experimental intertidal ecology (6)
BIOL3320 The biology of marine mammals (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

## Remarks:

Minor Title Minor in Marine Biology

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g. business, engineering and social science) an excellent opportunity to enter into a career or research in marine environmentrelated fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratorybased, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and projectbased learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratorybased, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

## Required courses (36 credits)

## 1. Introductory level courses (12 credits)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

Evolutionary diversity (6) BIOL1309 Environmental life science (6) ENVS1301 Ecology and evolution (6) **BIOL2306** 

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

BIOL3301 Marine biology (6)

Environmental oceanography (6) **FNVS3313** 

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

Tropical and temperate marine ecology field course (6) **BIOL3305** 

Experimental intertidal ecology (6) BIOL3318 BIOL3320 The biology of marine mammals (6) BIOL3322 Marine invertebrate zoology (6)

Nearshore marine and estuarine ecology (6) **BIOL3328** 

Fish and fisheries (6) BIOL4301

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

## Remarks:

Minor Title Minor in Marine Biology

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g. business, engineering and social science) an excellent opportunity to enter into a career or research in marine environmentrelated fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework. labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratorybased, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and projectbased learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratorybased, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

## Required courses (36 credits)

## 1. Introductory level courses (12 credits)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

Evolutionary diversity (6) BIOL1309 Environmental life science (6) FNVS1301 Ecology and evolution (6) **BIOL2306** 

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

BIOL3301 Marine biology (6)

Environmental oceanography (6) **FNVS3313** 

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

Tropical and temperate marine ecology field course (6) **BIOL3305** 

Experimental intertidal ecology (6) BIOL3318 BIOL3320 The biology of marine mammals (6) BIOL3322 Marine invertebrate zoology (6)

Nearshore marine and estuarine ecology (6) **BIOL3328** 

Fish and fisheries (6) BIOL4301

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Marine Biology

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g.business, engineering and social science) an excellent opportunity to enter into a career or research in marine environment-related fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

## Impermissible Combinations:

NII

## Required courses (36 credits)

## 1. Introductory level courses (12 credits)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)
ENVS1301 Environmental life science (6)
BIOL2306 Ecology and evolution (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

BIOL3301 Marine biology (6)

ENVS3313 Environmental oceanography (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3318 Experimental intertidal ecology (6)
BIOL3320 The biology of marine mammals (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

## Notes:

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Mathematics

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

## Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

## 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (18 credits)

**Disciplinary Electives (18 credits)** 

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3301 Algebra I (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6) MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6) MATH3999 Directed studies in mathematics (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)
MATH7101 Intermediate complex analysis (6)

MATH7201 Topics in geometry (6) MATH7202 Complex manifolds (6)

MATH7217 Topics in financial mathematics (6)
MATH7219 Topics in applied functional analysis (6)

MATH7224 MATH7501 MATH7502 MATH7503 MATH7504 MATH7505	Topics in advanced probability theory (6) Topics in algebra (6) Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) Geometric topology (6) Real analysis (6)
MATH7505	Real analysis (6)

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. If students would like to take more courses in analysis such as MATH3401 (Analysis I), they are advised to take the introductory course MATH2241 Introduction to mathematical analysis first.
- 4. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curricullum/overlapping-course-req.

### Remarks:

Minor Title Minor in Mathematics

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

## Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

## 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (18 credits)

**Disciplinary Electives (18 credits)** 

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

List A

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MATH3301 Algebra I (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6) MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)
MATH3999 Directed studies in mathematics (6)

MATH3999 Directed studies in ma MATH4302 Algebra II (6) MATH4402 Analysis II (6)

MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)
MATH7101 Intermediate complex analysis (6)

MATH7201 Topics in geometry (6) MATH7202 Complex manifolds (6)

MATH7217 Topics in financial mathematics (6)
MATH7219 Topics in applied functional analysis (6)

MATH7224 MATH7501 MATH7502 MATH7503 MATH7504	Topics in advanced probability theory (6) Topics in algebra (6) Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) Geometric topology (6) Real analysis (6)	
MATH7505	Real analysis (6)	

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. If students would like to take more courses in analysis such as MATH3401 (Analysis I), they are advised to take the introductory course MATH2241 Introduction to mathematical analysis first.
- 4. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

### Remarks:

Minor Title Minor in Mathematics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

## Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

## 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (18 credits)

## **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

List A

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MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
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MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6) MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6) MATH3999 Directed studies in mathematics (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)

MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

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MATH4910 Senior mathematics seminar (6)
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MATH4999 Mathematics project (12)
MATH7101 Intermediate complex analysis (6)

MATH7201 Topics in geometry (6) MATH7202 Complex manifolds (6)

MATH7217 Topics in financial mathematics (6)
MATH7219 Topics in applied functional analysis (6)

MATH7224 MATH7501 MATH7502 MATH7503 MATH7504	Topics in advanced probability theory (6) Topics in algebra (6) Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) Geometric topology (6)
MATH7504 MATH7505	Real analysis (6)

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. If students would like to take more courses in analysis such as MATH3401 (Analysis I), they are advised to take the introductory course MATH2241 Introduction to mathematical analysis first.
- 4. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

### Remarks:

Minor Title Minor in Mathematics

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

## Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

## 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (18 credits)

#### **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

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MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

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MATH3906 Financial calculus (6) MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH3999 Directed studies in mathematics (6)
MATH4302 Algebra II (6)
MATH4402 Analysis II (6)

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MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

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MATH7219 Topics in applied functional analysis (6)

MATH7224 MATH7501 MATH7502 MATH7503 MATH7504 MATH7505	Topics in advanced probability theory (6) Topics in algebra (6) Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) Geometric topology (6) Real analysis (6)
MATH7505	Real analysis (6)

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
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### Remarks:

Minor Title Minor in Mathematics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

## Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (18 credits)

## Disciplinary Electives (18 credits)

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

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MATH7224 MATH7501 MATH7502 MATH7503 MATH7504	Topics in advanced probability theory (6) Topics in algebra (6) Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) Geometric topology (6) Real analysis (6)	
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- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
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### Remarks:

Minor Title Minor in Mathematics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
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- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

#### Required courses (36 credits)

## 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
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MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)
MATH3999 Directed studies in mathematics (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)
MATH7101 Intermediate complex analysis (6)
MATH7201 Topics in geometry (6)

MATH7201 Topics in geometry (6)
MATH7202 Complex manifolds (6)

MATH7217 Topics in financial mathematics (6)
MATH7219 Topics in applied functional analysis (6)
MATH7224 Topics in advanced probability theory (6)

MATH7501 MATH7502	Topics in algebra (6) Topics in applied discrete mathematics (6)
MATH7503	Topics in mathematical programming and optimization (6)
MATH7504	Geometric topology (6)
MATH7505	Real analysis (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. If students would like to take more courses in analysis such as MATH3401 (Analysis I), they are advised to take the introductory course MATH2241 Introduction to mathematical analysis first.
- 4. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks

Offered to students admitted to Year 1 in

2017

#### Objectives:

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

#### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6) BIOL1309 Evolutionary diversity (6)

BIOC2600 Basic biochemistry (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOL2306 Ecology and evolution (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both. May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both.

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

# 2. Advanced level courses (24 credits) Disciplinary Core Courses (6 credits)

BIOL3401 Molecular biology (6)

#### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3409 Business aspects of biotechnology (6)
BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)
BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

BIOL4415 Healthcare biotechnology (6)
BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)
ENVS4110 Environmental remediation (6)

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students

2016

admitted to Year 1 in

#### Objectives:

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

## Required courses (36 credits)

## 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6) BIOL1309 Evolutionary diversity (6)

BIOC2600 Basic biochemistry (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOL2306 Ecology and evolution (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both. May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both.

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

# 2. Advanced level courses (24 credits) Disciplinary Core Courses (6 credits)

BIOL3401 Molecular biology (6)

#### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL 3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3409 Business aspects of biotechnology (6)
BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)
BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)
ENVS4110 Environmental remediation (6)

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students admitted to Year 1 in

2015

#### Objectives:

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

iviajoi iii ivioleculai bic	logy & Diotechnology						
Required courses (36 credits) 1. Introductory level courses (12 credits) Disciplinary Electives (12 credits)							
						s selected from the following courses:	
					BIOL1110	From molecules to cells (6)	
BIOL1309	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to					
		fulfill this 12 credits requirement, but not both.					
BIOC2600	Basic biochemistry (6)	May take either BIOL2220 or BIOC2600 to					
BIOL2102	Biostatistics (6)	fulfill this 12 credits requirement, but not both.					
BIOL2102	Biological sciences laboratory course (6)						
BIOL2220	Principles of biochemistry (6)	May take either BIOL2220 or BIOC2600 to					
DIOLZZZO	Timospies of bloomermous (o)	fulfill this 12 credits requirement, but not both.					
BIOL2306	Ecology and evolution (6)	May take either BIOL1309 or BIOL2306 to					
		fulfill this 12 credits requirement, but not both.					
	courses (24 credits)						
	Courses (6 credits)						
BIOL3401	Molecular biology (6)						
Disciplinary Electi	` ,						
	s selected from the following courses:						
BIOL3402	Cell biology and cell technology (6)						
BIOL3403	Immunology (6)						
BIOL3409	Business aspects of biotechnology (6)	T-1: # DIOL 0500 DIOL 4400 +- 5-1511					
BIOL3508	Microbial physiology and biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both.					
		BIOL3508 and BIOL4402 are mutually					
		exclusive.					
BIOL4401	Medical microbiology and applied immunology (6)	***************************************					
BIOL4402	Microbial biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill					
		this 18 credits requirement, but not both.					
		BIOL3508 and BIOL4402 are mutually					
BIOL4411	Plant and food biotechnology (6)	exclusive.					
BIOL4415	Healthcare biotechnology (6)						
BIOL4416	Stem cells and regenerative biology (6)						
BIOL4417	'Omics' and systems biology (6)						
ENVS4110	Environmental remediation (6)						
	(1)						

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students

2014

admitted to Year 1 in

#### Objectives:

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

iviajoi iii ivioleculai bic	logy & Diotechnology						
Required courses (36 credits) 1. Introductory level courses (12 credits) Disciplinary Electives (12 credits)							
						s selected from the following courses:	
					BIOL1110	From molecules to cells (6)	
BIOL1309	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to					
		fulfill this 12 credits requirement, but not both.					
BIOC2600	Basic biochemistry (6)	May take either BIOL2220 or BIOC2600 to					
BIOL2102	Biostatistics (6)	fulfill this 12 credits requirement, but not both.					
BIOL2102	Biological sciences laboratory course (6)						
BIOL2220	Principles of biochemistry (6)	May take either BIOL2220 or BIOC2600 to					
DIOLZZZO	Timospies of bloomermous (o)	fulfill this 12 credits requirement, but not both.					
BIOL2306	Ecology and evolution (6)	May take either BIOL1309 or BIOL2306 to					
		fulfill this 12 credits requirement, but not both.					
	courses (24 credits)						
	Courses (6 credits)						
BIOL3401	Molecular biology (6)						
Disciplinary Electi	` ,						
	s selected from the following courses:						
BIOL3402	Cell biology and cell technology (6)						
BIOL3403	Immunology (6)						
BIOL3409	Business aspects of biotechnology (6)	T-1: # DIOL 0500 DIOL 4400 +- 5-1511					
BIOL3508	Microbial physiology and biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both.					
		BIOL3508 and BIOL4402 are mutually					
		exclusive.					
BIOL4401	Medical microbiology and applied immunology (6)	***********					
BIOL4402	Microbial biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill					
		this 18 credits requirement, but not both.					
		BIOL3508 and BIOL4402 are mutually					
BIOL4411	Plant and food biotechnology (6)	exclusive.					
BIOL4415	Healthcare biotechnology (6)						
BIOL4416	Stem cells and regenerative biology (6)						
BIOL4417	'Omics' and systems biology (6)						
ENVS4110	Environmental remediation (6)						
	(1)						

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students admitted to Year 1 in

2013

#### Ohlastivasi

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

iviajoi iii ivioleculai bic	logy & Diotechnology						
Required courses (36 credits) 1. Introductory level courses (12 credits) Disciplinary Electives (12 credits)							
						s selected from the following courses:	
					BIOL1110	From molecules to cells (6)	
BIOL1309	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to					
		fulfill this 12 credits requirement, but not both.					
BIOC2600	Basic biochemistry (6)	May take either BIOL2220 or BIOC2600 to					
BIOL2102	Biostatistics (6)	fulfill this 12 credits requirement, but not both.					
BIOL2102	Biological sciences laboratory course (6)						
BIOL2220	Principles of biochemistry (6)	May take either BIOL2220 or BIOC2600 to					
DIOLZZZO	Timospies of bloomermous (o)	fulfill this 12 credits requirement, but not both.					
BIOL2306	Ecology and evolution (6)	May take either BIOL1309 or BIOL2306 to					
		fulfill this 12 credits requirement, but not both.					
	courses (24 credits)						
	Courses (6 credits)						
BIOL3401	Molecular biology (6)						
Disciplinary Electi	` ,						
	s selected from the following courses:						
BIOL3402	Cell biology and cell technology (6)						
BIOL3403	Immunology (6)						
BIOL3409	Business aspects of biotechnology (6)	T-1: # DIOL 0500 DIOL 4400 +- 5-1511					
BIOL3508	Microbial physiology and biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both.					
		BIOL3508 and BIOL4402 are mutually					
		exclusive.					
BIOL4401	Medical microbiology and applied immunology (6)	***********					
BIOL4402	Microbial biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill					
		this 18 credits requirement, but not both.					
		BIOL3508 and BIOL4402 are mutually					
BIOL4411	Plant and food biotechnology (6)	exclusive.					
BIOL4415	Healthcare biotechnology (6)						
BIOL4416	Stem cells and regenerative biology (6)						
BIOL4417	'Omics' and systems biology (6)						
ENVS4110	Environmental remediation (6)						
	(1)						

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students

2012

admitted to Year 1 in

#### Objectives:

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

iviajor iri iviolecular bio	logy & Biotechnology			
Required courses	(36 credits)			
1. Introductory level courses (12 credits)				
Disciplinary Electiv	,			
	s selected from the following courses:			
BIOL1110	From molecules to cells (6)			
BIOL1309	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to		
BIOLIOGO	_ relationary arrelatify (e)	fulfill this 12 credits requirement, but not both.		
BIOC2600	Basic biochemistry (6)	May take either BIOL2220 or BIOC2600 to		
		fulfill this 12 credits requirement, but not both.		
BIOL2102	Biostatistics (6)			
BIOL2103	Biological sciences laboratory course (6)			
BIOL2220	Principles of biochemistry (6)	May take either BIOL2220 or BIOC2600 to		
DIOL 2206	Foology and evalution (6)	fulfill this 12 credits requirement, but not both.  May take either BIOL1309 or BIOL2306 to		
BIOL2306	Ecology and evolution (6)	fulfill this 12 credits requirement, but not both.		
2. Advanced level of	courses (24 credits)	rumin ting 12 creates requirement, but not both.		
Disciplinary Core C				
BIOI 3401	Molecular biology (6)			
Disciplinary Electiv				
	s selected from the following courses:			
BIOL3402	Cell biology and cell technology (6)			
BIOL3403	Immunology (6)			
BIOL3409	Business aspects of biotechnology (6)			
BIOL3508	Microbial physiology and biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill		
		this 18 credits requirement, but not both.		
		BIOL3508 and BIOL4402 are mutually		
		exclusive.		
BIOL4401	Medical microbiology and applied immunology (6)			
BIOL4402	Microbial biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill		
		this 18 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually		
		exclusive.		
BIOL4411	Plant and food biotechnology (6)			
BIOL4415	Healthcare biotechnology (6)			
BIOL4416	Stem cells and regenerative biology (6)			
BIOL4417	'Omics' and systems biology (6)			
ENVS4110	Environmental remediation (6)			

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Minor Title Minor in Operations Research & Mathematical Programming

Offered to students

admitted to Year 1 in

## Objectives:

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

2017

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

### Required courses (42 credits)

## 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Core Courses (12 credits)**

MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6) MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6) MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Minor Title Minor in Operations Research & Mathematical Programming

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

2016

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

### Required courses (42 credits)

## 1. Introductory level courses (18 credits) (note 3)

#### **Disciplinary Core Courses (18 credits)**

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Core Courses (12 credits)**

MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6) MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6) MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6) MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Minor Title Minor in Operations Research & Mathematical Programming

Offered to students

admitted to Year 1 in

**Objectives:** The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

2015

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and projectbased learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

### Required courses (42 credits)

## 1. Introductory level courses (18 credits) (note 3)

#### **Disciplinary Core Courses (18 credits)**

MATH1013 University mathematics II (6) Linear algebra I (6) MATH2101 MATH2211 Multivariable calculus (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Core Courses (12 credits)**

Operations research I (6) MATH3901 MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

Differential equations (6) MATH3405 MATH3600 Discrete mathematics (6)

Queueing theory and simulation (6) **MATH3905** 

**MATH3906** Financial calculus (6) Game theory and strategy (6) MATH3911

Network models in operations research (6) MATH3943

Operations research II (6) MATH4902

Numerical methods for financial calculus (6) MATH4907 MATH7502 Topics in applied discrete mathematics (6)

Topics in mathematical programming and optimization (6) MATH7503

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Minor Title Minor in Operations Research & Mathematical Programming

Offered to students

admitted to Year 1 in

## Objectives:

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

2014

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

### Required courses (42 credits)

## 1. Introductory level courses (18 credits) (note 3)

#### **Disciplinary Core Courses (18 credits)**

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Core Courses (12 credits)**

MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6) MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6) MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6) MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Minor Title Minor in Operations Research & Mathematical Programming

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

2013

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

### Required courses (42 credits)

## 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Core Courses (12 credits)**

MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6) MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6) MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6) MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Minor Title Minor in Physics

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (18 credits)** 

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6) Observational astronomy (6) **PHYS3650** PHYS3651 The physical universe (6) Principles of astronomy (6) PHYS3652 PHYS3750 Laser and spectroscopy (6) Physics of nanomaterials (6) PHYS3751 Waves and optics (6) **PHYS3850** Atomic and nuclear physics (6) PHYS3851 Directed studies in physics (6) PHYS3999

PHYS4150 Computational physics (6)
PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4650 Stellar physics (6)
PHYS4651 Selected topics in astrophysics (6)

PHYS4651 Selected topics in astrophysics (6)
PHYS4652 Planetary science (6)

PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS4750 Experimental physics (6)
PHYS4850 Particle physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

PHYS4999 Physics project (12)
PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For

details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Minor Title Minor in Physics

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (18 credits)** 

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6) Observational astronomy (6) **PHYS3650** PHYS3651 The physical universe (6) Principles of astronomy (6) PHYS3652 PHYS3750 Laser and spectroscopy (6) PHYS3751 Physics of nanomaterials (6) Waves and optics (6) **PHYS3850** Atomic and nuclear physics (6) PHYS3851 Directed studies in physics (6) PHYS3999

PHYS4150 Computational physics (6)
PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS4750 Experimental physics (6)
PHYS4850 Particle physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

Physics project (12) PHYS4999 Graduate classical mechanics (6) PHYS7350 PHYS7351 Graduate quantum mechanics (6) PHYS7450 Graduate electromagnetism (6) Graduate statistical mechanics (6) PHYS7550 PHYS7551 Graduate solid state physics (6) Stellar atmospheres (6) PHYS7650 PHYS7750 Nanophysics (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For

details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Minor Title Minor in Physics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (18 credits)** 

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6) Observational astronomy (6) **PHYS3650** PHYS3651 The physical universe (6) Principles of astronomy (6) PHYS3652 PHYS3750 Laser and spectroscopy (6) PHYS3751 Physics of nanomaterials (6) Waves and optics (6) **PHYS3850** Atomic and nuclear physics (6) PHYS3851 Directed studies in physics (6) PHYS3999 PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS4750 Experimental physics (6)
PHYS4850 Particle physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

PHYS4999 Physics project (12)
PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For

details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Minor Title Minor in Physics

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

## Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (18 credits)** 

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)

PHYS3450 Electromagnetism (6)
PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3550 PHYS3551 Introductory solid state physics (6) Observational astronomy (6) **PHYS3650** PHYS3651 The physical universe (6) Principles of astronomy (6) PHYS3652 PHYS3750 Laser and spectroscopy (6) PHYS3751 Physics of nanomaterials (6) Waves and optics (6) **PHYS3850** Atomic and nuclear physics (6) PHYS3851 Directed studies in physics (6) PHYS3999

PHYS4150 Computational physics (6)
PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS4750 Experimental physics (6)
PHYS4850 Particle physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

Physics project (12) PHYS4999 Graduate classical mechanics (6) PHYS7350 PHYS7351 Graduate quantum mechanics (6) PHYS7450 Graduate electromagnetism (6) PHYS7550 Graduate statistical mechanics (6) PHYS7551 Graduate solid state physics (6) Stellar atmospheres (6) PHYS7650 PHYS7750 Nanophysics (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For

details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Minor Title Minor in Physics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (18 credits)** 

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Modern physics (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6) Observational astronomy (6) **PHYS3650** PHYS3651 The physical universe (6) Principles of astronomy (6) PHYS3652 PHYS3750 Laser and spectroscopy (6) Physics of nanomaterials (6) PHYS3751 Waves and optics (6) **PHYS3850** Atomic and nuclear physics (6) PHYS3851 Directed studies in physics (6) PHYS3999

PHYS4150 Computational physics (6)
PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652
PHYS4653
Cosmology (6)
PHYS4654
General relativity (6)
PHYS4655
Interstellar medium (6)
PHYS4750
Experimental physics (6)
PHYS4850
PHYS4966
PHYS4999
Physics internship (6)
PHYS4999
Physics project (12)

Physics project (12) PHYS4999 Graduate classical mechanics (6) PHYS7350 PHYS7351 Graduate quantum mechanics (6) PHYS7450 Graduate electromagnetism (6) Graduate statistical mechanics (6) PHYS7550 PHYS7551 Graduate solid state physics (6) Stellar atmospheres (6) PHYS7650 PHYS7750 Nanophysics (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For

details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Minor Title Minor in Physics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (18 credits)** 

Fundamental physics (6) PHYS1250 Introductory mechanics (6) PHYS2250 **PHYS2265** Modern physics (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

**PHYS3150** Theoretical physics (6) PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) Electromagnetism (6) **PHYS3450** 

PHYS3550 Statistical mechanics & thermodynamics (6) PHYS3551 Introductory solid state physics (6)

Observational astronomy (6) **PHYS3650** PHYS3651 The physical universe (6) Principles of astronomy (6) PHYS3652 PHYS3750 Laser and spectroscopy (6) Physics of nanomaterials (6) PHYS3751 Waves and optics (6) **PHYS3850** Atomic and nuclear physics (6) PHYS3851 Directed studies in physics (6) PHYS3999 PHYS4150 Computational physics (6)

Data analysis and modeling in physics (6) PHYS4151 PHYS4350 Advanced classical mechanics (6) PHYS4351 Advanced quantum mechanics (6) **PHYS4450** Advanced electromagnetism (6) PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6)

Stellar physics (6) **PHYS4650** 

PHYS4651 Selected topics in astrophysics (6) Planetary science (6) PHYS4652

Cosmology (6) **PHYS4653** General relativity (6) **PHYS4654** Interstellar medium (6) **PHYS4655** PHYS4750 Experimental physics (6) PHYS4850 Particle physics (6) **PHYS4966** Physics internship (6) Physics project (12) PHYS4999

Graduate classical mechanics (6) PHYS7350 PHYS7351 Graduate quantum mechanics (6) PHYS7450 Graduate electromagnetism (6) Graduate statistical mechanics (6) PHYS7550 PHYS7551 Graduate solid state physics (6) Stellar atmospheres (6) PHYS7650 PHYS7750 Nanophysics (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Offered to students 2017

admitted to Year 1 in

#### Objectives:

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NIL

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NII

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NII

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NIL

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

## 2. Advanced level courses (24 credits)

## **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NIL

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2012

admitted to Year 1 in

#### Objectives:

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NII

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

## 2. Advanced level courses (30 credits)

### Disciplinary Electives (30 credits)

## At least 30 credits selected from the following courses:

STAT3609 The statistics of investment risk (6)
STAT3610 Risk management and insurance (6)
STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6) STAT3614 Business forecasting (6)

STAT3615 Practical mathematics for investment (6) STAT3618 Derivatives and risk management (6)

STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

#### Notes

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

2016

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

Probability and statistics I (6)

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)

STAT2601 List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

## 2. Advanced level courses (30 credits)

### Disciplinary Electives (30 credits)

#### At least 30 credits selected from the following courses: STAT3609 The statistics of investment risk (6)

STAT3610 Risk management and insurance (6)
STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6) STAT3614 Business forecasting (6)

STAT3615 Practical mathematics for investment (6) STAT3618 Practical mathematics for investment (6)

STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

#### Notes

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6) STAT1602 Business statistics (6)

STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

## 2. Advanced level courses (30 credits)

## Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses: STAT3609 The statistics of investment risk (6) STAT3610 Risk management and insurance (6)

STAT3610 Risk management and insurance (iiii STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6) STAT3614 Business forecasting (6)

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STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

#### Notes

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)

STAT1603 Introductory statistics (6) STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

## 2. Advanced level courses (30 credits)

## Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses: STAT3609 The statistics of investment risk (6)

STAT3610 Risk management and insurance (6)
STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6) STAT3614 Business forecasting (6)

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STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

#### Notes

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)

STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

#### 2. Advanced level courses (30 credits)

## **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses: STAT3609 The statistics of investment risk (6) STAT3610 Risk management and insurance (6)

STAT3611 Computer-aided data analysis (6) STAT3612 Data mining (6)

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STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Minor Title Minor in Risk Management

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)

STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

#### 2. Advanced level courses (30 credits)

# **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses: STAT3609 The statistics of investment risk (6) STAT3610 Risk management and insurance (6) STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6) STAT3614 Business forecasting (6)

STAT3615 Practical mathematics for investment (6) STAT3618 Derivatives and risk management (6)

STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students

admitted to Year 1 in

#### Objectives:

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2017

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

Minor in Risk Management

#### Required courses (42 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A
STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)
List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2605 Demographic and socio-economic statistics (6)

# 2. Advanced level courses (30 credits)

# **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses: STAT3600 Linear statistical analysis (6)

STAT3602 Statistical inference (6) STAT3603 Probability modelling (6)

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6) STAT3613 Marketing engineering (6) STAT3614 Business forecasting (6)

STAT3614
STAT3616
Advanced SAS programming (6)
STAT3617
Sample survey methods (6)
STAT3620
Modern nonparametric statistics (6)
STAT3621
Statistical data analysis (6)
STAT3955
Survival analysis (6)
STAT4601
Time-series analysis (6)
STAT4602
Multivariate data analysis (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students

admitted to Year 1 in

#### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2016

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

Minor in Risk Management

#### Required courses (42 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A
STAT1601
STAT1602
STAT1603
STAT2601
STAT2601
Elementary statistical methods (6)
Business statistics (6)
Introductory statistics (6)
Probability and statistics I (6)
List B
STAT2602
Probability and statistics II (6)

STAT2602 Probability and statistics if (6)
STAT2603 Data management with SAS (6)

STAT2605 Demographic and socio-economic statistics (6)

# 2. Advanced level courses (30 credits)

# **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses: STAT3600 Linear statistical analysis (6)

STAT3602 Statistical inference (6)
STAT3603 Probability modelling (6)
STAT3604 Design and analysis of ax

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6)
STAT3613 Marketing engineering (6)
STAT3614 Business forecasting (6)
STAT3616 Advanced SAS programming (6)

STAT3617 Sample survey methods (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3955 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students

admitted to Year 1 in

#### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

# Learning Outcomes:

By the end of this programme, students should be able to:

2015

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

Minor in Risk Management

#### Required courses (42 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A STAT1601 Elementary statistical methods (6) STAT1602 Business statistics (6) STAT1603 Introductory statistics (6) Probability and statistics I (6) STAT2601 List B STAT2602 Probability and statistics II (6)

STAT2603 Data management with SAS (6)

Demographic and socio-economic statistics (6) STAT2605

# 2. Advanced level courses (30 credits)

# **Disciplinary Electives (30 credits)**

STAT3600

At least 30 credits selected from the following courses:

Statistical inference (6) STAT3602 STAT3603 Probability modelling (6) Design and analysis of experiments (6) STAT3604

STAT3605 Quality control and management (6) STAT3606 Business logistics (6)

STAT3607

Statistics in clinical medicine and bio-medical research (6) STAT3608 Statistical genetics (6)

Linear statistical analysis (6)

STAT3611

Computer-aided data analysis (6)

STAT3612 Data mining (6) STAT3613 Marketing engineering (6) STAT3614 Business forecasting (6) STAT3616 Advanced SAS programming (6) STAT3617 Sample survey methods (6) Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621

Survival analysis (6) STAT3955 STAT4601 Time-series analysis (6) STAT4602 Multivariate data analysis (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

#### Remarks:

Offered to students

admitted to Year 1 in

#### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2014

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

Minor in Risk Management

#### Required courses (42 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A
STAT1601
STAT1602
STAT1603
STAT2601
STAT2601
Elementary statistical methods (6)
Business statistics (6)
Introductory statistics (6)
Probability and statistics I (6)
List B
STAT2602
Probability and statistics II (6)

STAT2602 Probability and statistics if (6)
STAT2603 Data management with SAS (6)

STAT2605 Demographic and socio-economic statistics (6)

# 2. Advanced level courses (30 credits)

# Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses: STAT3600 Linear statistical analysis (6)

STAT3602 Statistical inference (6)
STAT3603 Probability modelling (6)
STAT3604 Design and analysis of ex-

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6)
STAT3613 Marketing engineering (6)
STAT3614 Business forecasting (6)
STAT3616 Advanced SAS programm

STAT3616 Advanced SAS programming (6)
STAT3617 Sample survey methods (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3955 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses

#### Remarks:

Offered to students

admitted to Year 1 in

#### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2013

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Decision Analytics

Major in Risk Management

Major in Statistics

Minor in Risk Management

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### Disciplinary Electives (12 credits)

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2605 Demographic and socio-economic statistics (6)

# 2. Advanced level courses (30 credits)

# Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:

STAT3600 Linear statistical analysis (6) STAT3602 Statistical inference (6) STAT3603 Probability modelling (6)

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6)

STAT3613 Marketing engineering (6)
STAT3614 Business forecasting (6)
STAT3616 Advanced SAS programming (6)
STAT3617 Sample survey methods (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)

STAT3955 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks

Offered to students

admitted to Year 1 in

#### Objectives:

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2012

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Decision Analytics

Major in Risk Management

Major in Statistics

Minor in Risk Management

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### Disciplinary Electives (12 credits)

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)

STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2605 Demographic and socio-economic statistics (6)

# 2. Advanced level courses (30 credits)

# **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3600 Linear statistical analysis (6) STAT3602 Statistical inference (6) STAT3603 Probability modelling (6)

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3611 Computer-aided data analysis (6)

STAT3612 Data mining (6)

STAT3613 Marketing engineering (6)
STAT3614 Business forecasting (6)
STAT3616 Advanced SAS programming (6)
STAT3617 Sample survey methods (6)
STAT3620 Modern nonparametric statistics (6)

STAT3621 Statistical data analysis (6)
STAT3955 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

#### Notes:

#### Remarks

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Students taking double Majors,

Major-Minor or double Minors with overlapping course requirements

# SCIENCE

# SECTION VIII Students taking double Majors, Major-Minor or double Minors with overlapping course requirements

- 1. Double-counting of courses up to a maximum of 24 credits is permissible with double majors. The double-counted courses in both Science majors must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. The following list shows the major-major combinations that have more than 24 credits of the same 'disciplinary core' courses that appear in both majors and is subject to the rule of double counting:

Major-Major combination	Admission Year (Year 1)	No. of common 'disciplinary core' courses (credits) appear in both majors including SCNC1111 and SCNC1112	No. of replacement courses (credits) to be taken in the 2 <sup>nd</sup> major ('Major 2')
Major in Astronomy Major in Mathematics/Physics	2012, 2013, 2014	5 (30 credits)	1 (6 credits)
Major in Astronomy	2012, 2013, 2014	6 (36 credits)	2 (12 credits)
Major in Physics	2015, 2016, 2017	5 (30 credits)	1 (6 credits)
Major in Biochemistry Major in Chemistry	2015, 2016, 2017	5 (30 credits)	1 (6 credits)
Major in Biochemistry Major in Molecular Biology & Biotechnology	2012, 2013, 2014	5 (30 credits)	1 (6 credits)
Major in Biological Sciences Major in Ecology & Biodiversity	All years	7 (42 credits)	3 (18 credits)
	2012, 2014, 2017	6 (36 credits)	2 (12 credits)
Major in Biological Sciences  Major in Food & Nutritional Science	2013	5 (30 credits)	1 (6 credits)
	2015, 2016	7 (42 credits)	3 (18 credits)
Major in Biological Sciences	2012, 2013, 2014	5 (30 credits)	1 (6 credits)
Major in Molecular Biology & Biotechnology	2015, 2016, 2017	6 (36 credits)	2 (12 credits)
Major in Earth System Science Major in Geology	2012, 2013, 2014, 2015, 2016	5 (30 credits)	1 (6 credits)
Major in Ecology & Biodiversity	2013, 2017	5 (30 credits)	1 (6 credits)
Major in Food & Nutritional Science	2012, 2014, 2015, 2016	6 (36 credits)	2 (12 credits)
Major in Ecology & Biodiversity Major in Molecular Biology & Biotechnology	All years	5 (30 credits)	1 (6 credits)
Major in Food & Nutritional Science Major in Molecular Biology & Biotechnology	All years	6 (36 credits)	2 (12 credits)

If more than 24 credits (including SCNC1111 & SCNC1112) are listed as 'disciplinary core' courses required in both the first ('Major 1') and second ('Major 2') majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) in the second major ('Major 2'). The replacement course(s) must be the disciplinary elective course in the second major ('Major 2') and have the same prefix and at the same or higher level as the double-counted course(s). The double counted credits should count the following courses in this order: (1) SCNC1111 and SCNC1112, (2) introductory level (levels 1 and 2) courses, and (3) advanced level (level 3 or above) courses. For example, if a student takes a first major in Ecology & Biodiversity ('Major 1') and the 2<sup>nd</sup> major in Molecular Biology & Biotechnology ('Major 2'), SCNC1111, SCNC1112, BIOL1110, BIOL2102 and BIOL2103 are the common 'disciplinary core' courses that appear in both majors. The first 3 courses SCNC1111, SCNC1112, and BIOL1110 would first be counted plus either BIOL2102 or BIOL2103 for the major in Molecular Biology & Biotechnology. The student has to take a replacement 'disciplinary elective' course (with a prefix of BIOL at level 2 or above) in the 2<sup>nd</sup> major in Molecular Biology & Biotechnology to make up for BIOL2102 or BIOL2103.

- 3. Double counting of credits is not permissible for major–minor or double-minors combinations. When a course is required ('disciplinary core') both by the major and minor or by both minors, the student must take a replacement course for the minor. The replacement course must be the disciplinary elective in the minor and have the same prefix and at the same or higher level as the course to be replaced.
- 4. For students taking the Mathematics related majors/minors should note the following exemption and replacement arrangement:

Students who fall into the following exemption situation for the introductory level Disciplinary Core Mathematics courses in Science Majors/Minors are required to take the specified replacement course(s) as prescribed in the table:

Exempted Course	Exemption granted under the following circumstances	Specified Replacement Course
	For students taking Minor with an overlap of Disciplinary Core Course :	
	MATH1013	
	For students taking Programme / Major / Minor with Disciplinary Core Courses :	Select 6 credits from the following to replace MATH1013:  • MATH2012 Fundamental concepts of mathematics (6)
MATH1013 University mathematics II	MATH1851 and MATH1853 (which are together deemed equivalent to MATH1013)	MATH2241 Introduction to mathematical analysis (6)     Any 6-credit advanced level Mathematics Disciplinary Elective chosen from the Programme/Major/Minor structure in which MATH1013 is the disciplinary core
	For students taking Professional Core in Bachelor of Science in Actuarial Science with Disciplinary Core Course :	course
	MATH1821 (which is equivalent to MATH1013)	
MATH2014 Multivariable calculus and linear algebra	For students taking Professional Core in Bachelor of Science in Actuarial Science with Disciplinary Core Course :  MATH2822	Select 6 credits from the following to replace MATH2014:  MATH2012 Fundamental concepts of mathematics (6)  MATH2241 Introduction to mathematical analysis (6)  Any 6-credit advanced level Mathematics Disciplinary Elective chosen from the Major/Minor structure in which
MATH2101 Linear algebra I	(which is equivalent to MATH2014)  For students taking Minor with an overlap of Disciplinary Core Course :  MATH2101	MATH2014 is the disciplinary core course  Select 6 credits from the following to replace MATH2101:  MATH2012 Fundamental concepts of mathematics (6)  MATH2241 Introduction to mathematical analysis (6)  Any 6-credit advanced level Mathematics Disciplinary Elective chosen from the Minor structure in which MATH2101 is the disciplinary core course
MATH2211 Multivariable calculus	For students taking Minor with an overlap of Disciplinary Core Course :  MATH2211	Select 6 credits from the following to replace MATH2211:  MATH2012 Fundamental concepts of mathematics (6)  MATH2241 Introduction to mathematical analysis (6)  Any 6-credit advanced level Mathematics Disciplinary Elective chosen from the Minor structure in which MATH2211 is the disciplinary core course
18 credits of Introductory level courses requirement of the Minor: MATH1013 MATH2101 MATH2211	For students taking Professional Core in Bachelor of Science in Actuarial Science with Disciplinary Core courses:  MATH1821 and MATH2822 (which are together deemed to have satisfied MATH1013, MATH2101 & MATH2211)	Select 18 credits from the following to replace the credit requirement of MATH1013, MATH2101 & MATH2211:  • MATH2012 Fundamental concepts of mathematics (6) (if not the disciplinary core course in the structure); and/or  • MATH2241 Introduction to mathematical analysis (6) (if not the disciplinary core course in the structure); and/or  • Equivalent credits of advanced level Mathematics Disciplinary Elective(s) chosen from the Major/Minor structure in which MATH1013, MATH2101 & MATH2211 are the disciplinary core courses

5. For the situations of 2, 3 and 4 above, students have to complete the application form, seek the written endorsement from the Course Selection Adviser of the second major ('Major 2') / minor and then return it to the <u>Faculty Office</u> by the closing dates of course selection or add/drop periods.

**Course Descriptions** 

# SCIENCE

# SECTION IX Course Descriptions

BIOC1600			nistry (6 credits)	Academic Year	2017				
Offering Department		al Sciences		Quota					
Course Co-ordinator			nces (jatanner@hku.hk)						
Teachers Involved	,	Wong,Biomedical	•						
		Biomedical Science ner,Biomedical Scie							
	,	Cheng,Biomedical S	•						
		Huen,Biomedical S							
Course Objectives	- Teach st		cal perspective on each of the Basic S	Sciences focusing on concep	ots fundamental to				
	<ul><li>Promote</li><li>Inspire st</li><li>Help stu</li></ul>	deep learning of co tudents with a view dents make the tra	ourse material through an integrated pro of the great discoveries and future cha ansition from school to university by o nunicate within a Biochemistry learning	illenges for Biochemistry. developing their teamwork, ii					
Course Contents & Topics	A Biochemical Perspective on the Basic Sciences								
	The eleme Structure universal the B. Biology The basic Evolution C. Physics Thermody Statistics the logs and the D. Inspirin	A. Chemistry for Biochemistry The elements and bonding (from carbon to Coenzyme A); Resonance and orbital theory (a focus on the electron) Structure and conformation (thinking in 3 dimensions); Isomerism (from mirrors to thalidomide); Water (the universal biochemical solvent) & buffer; Quantitation in chemistry (who was Avogadro anyway?).  B. Biology for Biochemistry The basic building blocks of life (proteins, DNA, lipids, carbohydrate); The Central Dogma of Molecular Biology Evolution (considering molecular evolution); Origins of life (the chicken-egg paradox of proteins and DNA)  C. Physics and Mathematics for Biochemistry Thermodynamics from a Biological Perspective; Introduction to molecular recognition and binding (DNA melting) Statistics for biochemistry (applied statistics for what you really need to know); Thinking numbers (exponentials logs and the limits of life).  D. Inspiring Biochemistry							
			nins and disease; Synthetic biology;	The challenges of modern-da	ay genetics Drugs				
Course Learning		and failures.	his course, students should be able to:						
	CLO 2 ap mo CLO 3 int CLO 4 de sc CLO 5 rel	ply knowledge of olecular biology terpret scientific dat emonstrate skills in ientific ideas late how biochemis	hemistry and physics into a biochemical biomolecular structure to review material and discuss major issues in biochem working and collaborating together with the intersects with the three basic scion from school to university level study	ijor discoveries and contem istry using the scientific literal colleagues in practicals and ences of biology, chemistry	ture in presentation of				
Pre-requisites and Co-requisites and Impermissible		above in HKDSE	Biology, Chemistry, or Combined Scie		try component, o				
combinations)	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	05 : 004	2010		-				
Offer in 2017 - 2018 Grade Descriptors (A+ to F)	A B C D Fail	scientific data and the scientific literature; superior presentation and group collaboration skills.  B Good performance demonstrating full understanding of the subject matter; coherent insight into use of scientific data and the scientific literature; good presentation and group collaboration skills.  C Satisfactory performance demonstrating adequate understanding of the subject matter; some insight into use of scientific data and the scientific literature; some presentation and group collaboration skills.  D Limited performance demonstrating some understanding of basic subject matter; some ability to use scientific data and the scientific literature; limited presentation and group collaboration skills.							
Course Type		ased course							
Course Teaching	Activities	3	Details		No. of Hours				
& Learning Activities	Lectures		or workshops		36				
	Group wo		Practical classess		12				
		Self study	Tasks as 1 · · · · · · · ·		50				
	Assessme	ent	Tasks and preparation	144.1.141.1.2	30				
ssessment Methods nd Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignme		including practical writeups	20	CLO 1,2,3,4,5				
	Examinati	ion		50	CLO 1,2,3				
	Project re	ports	group communication project	30	CLO 2,3,4,5				
	TDC								
eading and	IBC								
Required/recommended reading and online materials Additional Course		ed as ENGG1207	"Foundations of biochemistry for med	ical engineering" to students	of the Faculty of				

BIOC2600	Basic biochemistry (6 credits)	Academic Year	2017
Offering Department	Biomedical Sciences	Quota	300
Course Co-ordinator	Prof D K Y Shum, Biomedical Sciences (shumdkhk@hku.hk)		
Teachers Involved	(Dr A S L Wong,Biomedical Sciences) (Dr C M Qian,Biomedical Sciences)		

		(Dr C W Lee,Biomedical Sciences) (Prof D K Y Shum,Biomedical Sciences)						
Course Objectives	This course is designed to present an overview of biochemistry of fundamental importance to the life process. We aim to develop appreciation of the basics in biochemistry as a common ground for science and non-science students to progress into their areas of specialization. Students intending to pursue further studies in Biochemistry and Molecular Biology will find this course particularly helpful.							
Course Contents & Topics		basic bioenergetics; I		icleic acids, amino acids and protei es in a living cell; signaling across ce				
Course Learning	On succe	ssful completion of this	s course, students shou	ıld be able to:				
Outcomes	CLO 1	relate structures to	functions of biomolecu	ıles				
	CLO 2	explain the function	ns of key metabolic pro	cesses				
	CLO 3	explain the signification	ance of signaling acros	s cell membranes				
	CLO 4	explain the flow of	genetic information					
Pre-requisites (and Co-requisites and Impermissible combinations)		ass in BIOC1600 or BIOL1110 or ENGG1207; and ot for students who have passed in BIOL2220 or MEDE2301, or have already enrolled in these courses.						
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 -	2019 : Y	Examinatio	n Dec			
Grade Descriptors (A+ to F)	A Demonstrates thorough and complete mastery of the entire range of knowledge and analytical skills as required for maximal attainment in all the course learning outcomes; excellence in critical thinking towards application of the knowledge in a range of contexts.							
	Demonstrates substantial command of a broad range of knowledge and analytical skills as required for attainment of the majority of course learning outcomes; good evidence of critical thinking towards application of the knowledge in a range of contexts.							
	С	Demonstrates general but incomplete command of knowledge and analytical skills as required for attainment of adequate course learning outcomes; some evidence critical thinking towards application of the knowledge in a range of contexts.						
	D	Demonstrates partial but limited command of knowledge and analytical skills as required for attainment of some of the course						
	Fail	Demonstrates little or no	evidence of command of	towards application of the knowledge in a range knowledge and analytical skills as required for application of the knowledge in a range of conte	attainment of the course			
Course Type	Lecture-b	ased course	ggg					
Course Teaching	Activities	S	Details		No. of Hours			
& Learning Activities	Lectures				36			
-	Tutorials				12			
	Reading / Self study				100			
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents		20	CLO 1,2,3,4			
	Examinat	tion		60	CLO 1,2,3,4			
	Test			20	CLO 1,2,3,4			
Required/recommended reading and online materials	Any other	lelson DL, Cox MM (2008) Lehninger Principles of Biochemistry, 5th ed. W.H. Freeman, New York. .ny other Biochemistry textbooks, e.g. Berg JM, Tymoczko JL, Stryer L (2012) Biochemistry, 7th ed. W.H. reeman, New York.						
Additional Course Information	Also offer	ed as MEDE2301 "Lif	fe Sciences I (Biochen considered to have pa	nistry)" to students of the Faculty of Essed BIOC2600.	Engineering. Students			

BIOC3601	Basic m	etabolism (6 credits) Academic Year	2017							
Offering Department	Biomedica	al Sciences Quota	80							
Course Co-ordinator	Dr N S Wo	N S Wong, Biomedical Sciences (nswong@hku.hk)								
Teachers Involved		Cheng,Biomedical Sciences) /ong,Biomedical Sciences)								
	Dr. L W L	(Dr. L W Lim,Biomedical Sciences)								
Course Objectives	some of t applied to energy. The	he aims to provide foundation concepts of metabolism. It will enable students of this course to see how the basic concepts in biochemistry (specifically those learned in BIOC1600 and BIOC2600) could be explain one of the most important and cardinal issues of biological life: the acquisition of metabolic the course will lay the foundation for the more advanced courses offered in the Biochemistry Major and erve as a useful complement to courses on nutrition.								
Course Contents & Topics	organisms breakdowi also be co	s course focuses on the central metabolic pathways involved in the provision of energy needed by living anisms. Major metabolic pathways covered in this course include those that are involved in the synthesis and akdown of glucose, glycogen, triacylglycerol, and amino acids. The metabolism of purines and pyrimidines will be considered. Emphasis is on the understanding of the metabolic reactions involved and how they are ulated in relation to environmental cues. Metabolic derangements as a basis of diseases will also be discussed.								
Course Learning	On successful completion of this course, students should be able to:									
Outcomes	CLO 1 explain the significance of individual steps in a metabolic pathway									
	CLO 2 recognize the importance and the need for regulation of metabolic pathways									
	CLO 3 discuss the roles of enzymes in the regulation of metabolic pathways									
	CLO 4 describe how metabolic process are integrated under different physiological and pathological conditions									
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	Pass in BIOC2600 or BIOL2220 or MEDE2301								
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2019 : Y Examination	Dec							
Grade Descriptors (A+ to F)	Demonstrates thorough and extensive knowledge and skills required for attaining all the course learning outcomes. Displays a strong analytical ability and logical thinking and is able to apply knowledge to a wide range of complex situations. Consistently able to communicate sophisticated ideas confidently and clearly.									
	B Demonstrates substantial knowledge and skills required for attaining most of the course learning outcomes. Shows evidence of analytical ability and logical thinking and is sometimes able to apply knowledge to complex situations. Often communicates complex ideas clearly.									
	С	Demonstrates general but incomplete knowledge and skills required for attaining most of the course learn evidence of some analytical ability and logical thinking and is sometimes able to apply knowledge to fam situations. Sometimes communicates ideas clearly.								
	D	Demonstrates limited knowledge and skills required for attaining some of the course learning outcomes.	Shows noor analytical							

	Fail Der	ability and logical thinking and is rarely able to apply knowledge to solve problems. Has difficulty in expressing ideas cold Demonstrates little or no evidence of knowledge and skills required for attaining the course learning outcomes. Lacks ability and logical thinking and is unable to apply knowledge to solve problems. Ineffective at communicating ideas.					
Course Type	Lecture-based	course					
Course Teaching & Learning Activities	Activities	Details		No. of Hours			
	Lectures	glycogen metabolis; lipid me	glycolysis; gluconeogenesis; pentose phosphate pathway; glycogen metabolis; lipid metabolis; purine and pyrimidine metabolism; regulation and integration of metabolic pathways				
	Tutorials	working on problems relating	working on problems relating to the lecture topics				
	Reading / Self	study		100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		25	CLO 1,2,3,4			
	Examination	2.5 hrs examination	2.5 hrs examination 75				
Required/recommended reading and online materials	Devlin TM (200	oczko JL, Stryer L (2007) Biochemistry, 6th ed. W 06) Textbook of Biochemistry: with Clinical Correla x MM (2008) Lehninger Principles of Biochemistry	ations, 6th ed. Wiley-Liss, Hobo				

BIOC3604	Essentia (6 credit	•	biochemistry and molecular biolo	gy Academic Yea	2017					
Offering Department	Biomedica	al Sciences		Quota	70					
Course Co-ordinator	Dr K M Ya	K M Yao, Biomedical Sciences (kmyao@hku.hk)								
Teachers Involved	(Dr K M Ya (Dr N S W (Dr. R C C (Prof D K	Wong,Biomedical Scientian,Biomedical Scientiang,Biomedical Scientiang,Biomedical Scientiang,Biomedical Y Shum,Biomedical Schou,Biomedical Scientiang,Biomedical Scientiang,Biome	nces) ences) Sciences) I Sciences)							
Course Objectives		To give students a general overview of different experimental approaches and model systems, and to provide students with hands-on experience in basic biochemical and molecular techniques.								
Course Contents & Topics	molecular, acids; sub	Basic concepts in experimental science; writing of lab notebooks; experimental approaches - genetic, biochemical, molecular, genomic and others; methods for isolation and analysis of carbohydrates, proteins, lipids and nucleic acids; subcellular fractionation; enzyme assays and spectrophotometry; basic nucleic acid manipulation - PCR, site-directed mutagenesis, blotting and hybridization, cloning strategies, restriction mapping.								
Course Learning			his course, students should be able to:	11 0						
Outcomes			inciples of various biochemical and moleci	ular techniques						
		<u> </u>	xperimental approaches for achieving defin							
	CLO 3	apply different techr	niques to biochemical and molecular analy	ses						
			a scientific laboratory notebook satisfactori							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	OC2600 or BIOL22	20 or MEDE2301							
Offer in 2017 - 2018	Y 2nd	sem Offer in 201	8 - 2019 : Y	Examination	May					
Grade Descriptors (A+ to F)	A Demonstrates thorough and extensive knowledge and skills required for attaining all the course learning out strong analytical ability and logical thinking, with evidence of original thought. Competently conducts labora techniques with confidence and can critically appraise data to draw appropriate and insightful conclusions.  B Demonstrates substantial knowledge and skills required for attaining most of the course learning outcomes. Sho critical thinking and analytical skills. Conducts laboratory skills and techniques with confidence and can apprais appropriate conclusions.  C Demonstrates general but incomplete knowledge and skills required for attaining most of the course learning out some evidence of critical thinking and analytical skills. Conducts laboratory skills and techniques to a satisf competence and can sometimes correctly appraise data and draw appropriate conclusions.  D Demonstrates partial but limited knowledge and skills required for attaining some of the course learning outcomes critical thinking and analytical skills. Displays poor laboratory skills and techniques and is rarely able to use appropriate conclusions.  Fail Demonstrates little or no evidence of knowledge and skills required for attaining the course learning outcomes. I									
	1	conclusions.								
Course Type	1	th laboratory compo			N 11					
Course Teaching & Learning Activities	Activities	•	Details		No. of Hours					
& Learning Activities	Lectures				· <del>-</del>					
	Laborator	У			72					
	Tutorials	Calfatudy			6 76					
A + 11 - 41		Self study	5.4.9	147 . 1 . 1 . 1						
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping					
	Assignments			50	CLO 1,2,3,4					
	Examinat	ion		50	CLO 1,2,3					
Required/recommended reading and online materials	Scopes R Verlag, Ne Wilson K,	Examination 50 CLO 1,2,3  Cox MM, Doudna JA and O'Donnell M (2012) Molecular Biology: Principles and Practice, Macmillan.  Scopes RK (1994) Protein Purification: Principles and Practice. Springer Advanced Texts in Chemistry, Springer-Verlag, New York.  Wilson K, Walker KM (2005) Principles and Techniques of Biochemistry and Molecular Biology. Cambridge University Press, Cambridge.								

BIOC3605	Sequence bioinformatics (6 credits)	Academic Year	2017
Offering Department	Biomedical Sciences	Quota	50
Course Co-ordinator	Dr B C W Wong, Biomedical Sciences (bcwwong@hku.hk)		

Teachers Involved	(Dr B C W Wong,Biomedical Sciences) (Dr. T T Y Lam,Publich Health)						
Course Objectives	This course will examine existing bioinformatics tools for DNA and protein sequence analysis. The underlying principles of these analysis programs and services will be presented. Students will learn how to retrieve, analyze and compare protein and DNA sequences using bioinformatics tools available on the World Wide Web.						
Course Contents & Topics	This cours	se will introduce a	and discuss the following topics:				
	DNA and protein sequence database, protein family databases; information searching and retrieval - SRS; Simple sequence analysis; sequence alignment: pair-wise alignment, multiple sequence substitution matrices; sequence database searching: algorithm and parameters; sequence patterns and profiles; phylogenetic analysis; gene prediction.						
Course Learning	On succes	ssful completion of	of this course, students should b	e able to:			
Outcomes			sequence information from biol				
	cc	nstruction		e alignments, BLAST search, and			
			, , , , , , ,	e and other web-based analysis to	ols		
			m sequence alignments and BLA				
				annotate a biological sequence			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC2600 or BIOL2220 or BBMS2003 or BBMS2007 or MEDE2301						
Offer in 2017 - 2018	Y 2nd	sem Offer in 2	018 - 2019 : Y	Examination	May		
Grade Descriptors	A	Demonstrates thorough and complete mastery at an advanced level of extensive knowledge and skills requested the course learning outcomes; strong critical thinking; excellent ability to apply bioinformatics skills in a range					
(A+ to F)	В	Demonstrates substantial command of a broad range of knowledge and skills required for attaining at least most of the course					
	С	learning outcomes; evidence of critical thinking; good ability to apply bioinformatics skills in a range of context.  Demonstrates general but incomplete command of knowledge and skills required for attaining most of the course learning outcome; some critical thinking; adequate ability to apply bioinformatics skills in a range of context.					
	D	Demonstrates partial but limited command of knowledge and skills required for attaining some of the course learning outcomes limited critical thinking; limited ability to apply bioinformatics skills in a range of context.					
	Fail Demonstrates little or no evidence of command of knowledge and skills required for attaining the course learning outcomes; lack of critical thinking; little or no ability to apply bioinformatics skills in a range of context.						
Course Type	Lecture-ha	ased course	ittle of no ability to apply biolinormatics s	skills in a range of context.			
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures	1	Details		36		
a. =0ag / tou	Tutorials				12		
		Self study			100		
Assessment Methods	Methods	ou. olday	Details	Weighting in final	Assessment		
and Weighting	Metrious		Details	course grade (%)	Methods to CLO Mapping		
	Assignme	ents		30	CLO 1,2,3,4,5		
	Examinat	ion		70	CLO 2,4		
Required/recommended reading and online materials	ed. Wiley,	Baxevanis AD, Ouellette BFF (2005) Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins, 3rd ed. Wiley, Hoboken, N.J. Mount DW (2004) Bioinformatics: Sequence and Genome Analysis, 2nd ed. Cold Spring Harbor Laboratory Press,					

BIOC3606	Molecul	lar medic	ine (6 cre	dits)				A	cademic Year	2017	
Offering Department	Biomedica	al Sciences Quota 50									
Course Co-ordinator	Prof D Y Jin, Biomedical Sciences (dyjin@hku.hk)										
Teachers Involved	(Dr. S K Y (Dr. YQ S (Prof D Y (Prof K S	Y Ma,Biom Song,Biome / Jin,Biome S E Cheah,E	cal Sciences edical Sciencedical Sciencedical Sciencedical Science Biomedical Sciencedical Scien	ices) ces) ces) Sciences)							
Course Objectives	disorders,	To provide up-to-date knowledge of the molecular and cellular basis of human diseases including skeletal disorders, cancer and infection with HIV and influenza viruses, thereby preparing the students for a career in biomedical, biotechnological, pharmaceutical and genomic research.									
Course Contents & Topics	Specific to signaling science, g checkpoir	This course covers molecular basis of skeletal disorders, cancer and viral diseases, and molecular therapeutics. Specific topics may include mouse model of human diseases, molecular basis of selected skeletal disorders, cell signaling in relation to human diseases, oncogenes and tumour suppressor genes, genome instability, HIV science, genetics and pathogenesis of influenza viruses, molecular approaches to vaccine development, immune checkpoint therapy, stem cells and stem cell therapy, gene therapy, and nucleic acid therapeutics. Basic knowledge of biochemistry and molecular cell biology is assumed for students taking this course.									
Course Learning Outcomes	CLO 1 ex CLO 2 illi CLO 3 in	explain the i	application d translate	echanism of molec	ns underlyi ular biolog	ng selecte y in medic	d human sk ine with exa	mples	orders, cancer hes in disease		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	Pass in BIOC2600 or BIOL2220 or MEDE2301									
Offer in 2017 - 2018	Y 2nd	d sem Of	ffer in 2018	- 2019 : Y	<b>'</b>			E	xamination	May	
Grade Descriptors (A+ to F)	Α	errors. Ab prevention	le to articulate	clearly wit	th examples be of strong a	how knowled nalytical and	dge in molecul d critical thinkin	lar biology	human diseases, can lead to new aling with complex	strategie	es in disease
	B Displays a substantial and near-complete grasp of the key concepts underlying the molecular basis of human diseases, but without depth in some areas and with some omissions and factual errors. An understanding of the topic though is clear. Able to										

		relate knowledge in molecular biology to new strategies in disease prevention and intervention. Able to apply critical thinking skills when dealing with scientific data.  Displays a general understanding of the key concepts underlying the molecular basis of human disease and is so relate knowledge in molecular biology to new strategies in disease prevention and intervention. Sometimes analytical and critical thinking skills when dealing with scientific data.						
	С							
	D	Displays a limited understark knowledge in molecular bio thinking skills when dealing						
	Fail			e key concepts underlying the molecular basis ategies. No evidence of analytical or critical thi				
Course Type	Lecture-ba	ased course						
Course Teaching	Activities		Details	No. of Hours				
& Learning Activities	Lectures			36				
	Tutorials			12				
	Reading / Self study				100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examinat	ion		80	CLO 1,2,3			
	Test			20	CLO 1,2,3			
Required/recommended reading and online materials	Alberts et		the Cell 6th ed., 2015 (	is available at NCBI Books) 4th ed. is available at NCBI Books)				

BIOC3999	Directed	studies in bioche	emistry (6 credits)	Academic Year	r 2017
Offering Department	Biomedica	l Sciences		Quota	36
Course Co-ordinator	Prof J D H	uang, Biomedical Sci	ences (jdhuang@hku.hk)		
Teachers Involved		mic staff in Biochemis Huang,Biomedical Sci	try Major,Biomedical Sciences) ences)		
Course Objectives	To enhand skills.	ce students knowledg	e of a particular topic and the stud	dents self-directed learning a	nd critical thinking
Course Contents & Topics	member. critical rev	The topic is preferably iew or a synthesis of p	f-managed study on a topic in to none not sufficiently covered in the published work on the subject. A la derstanding of the subject.	regular curriculum. The direc	ted study can be
Course Learning Outcomes	CLO 1 c	ritically appraise resea	s course, students should be able to arch literature in a specific area of b I or experimental basis for existing	oiochemistry and molecular bio	blogy
			evaluate issues for further research	•	
Pre-requisites (and Co-requisites and Impermissible combinations)	including I This capst	BIOC2600 and BIOL3 one course is for Bioc	Ivanced level (level 3 or 4) disciplin 401. Hemistry Major students only. Ivwed to take this capstone course is	,	Biochemistry Majo
Offer in 2017 - 2018			nmer Offer in 2018 - 2019 : Y	Examination	No Exam
Grade Descriptors (A+ to F)	A	understanding of the sele relevant issues emerging skills. Communicates the time-management skills a	ed and detailed appraisal of the biocher ceted topic. Able to contextualize all the idea if from the study. Works proactively with a findings to a broader audience in an effective and able to reflect honestly on one's own lear	as within a personal framework of kr supervisor to enhance understanding we way and responds knowledgeably rning.	nowledge and evaluate g and scientific writing to questions. Excellen
	В	contextualize many of the study. Works constructive	praisal of the biochemical literature, display i ideas within a personal framework of know ely with a supervisor to enhance understan lience and responds knowledgeably to mos	vledge and identify some relevant iss ding and scientific writing skills. Clea	ues emerging from the arly communicates the
	С	Produces a reasonable a to contextualize a few of issues emerging from the	ppraisal of the biochemical literature, displa the ideas within a personal framework of kno e study. Works with a supervisor and other findings to a broader audience with reaso lf-reflection skills.	owledge and makes some attempt to co-workers to improve understandin	identify some relevant g and scientific writing
	D	Produces a superficial ap contextualize a few of the from the study. Works re	opraisal of the biochemical literature, displa e ideas within a personal framework of know luctantly with a supervisor and other co-wo cation skills when presenting the findings	wledge but unable to identify any release to develop understanding and	evant issues emerging scientific writing skills
	Fail	contextualize the ideas w in isolation, thus failing to	ochemical literature and thus unable to dis ithin a personal framework of knowledge or o make progress in understanding and scier a broader audience. No time-management	identify any relevant issues emerging ntific writing skills. Unable to commun	from the study. Work
Course Type	Project-ba	sed course			
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Reading /	Self study	at least 120 hours on the projec	t	120
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Dissertati	on	including mind map (10%)	60	CLO 1,2,3
	Oral pres	entation		25	CLO 1,2,3
	Research	report	Supervisor comments	15	CLO 1,2,3
Required/recommended reading and online materials	as sugges	ted by project supervi	sors		

BIOC4610	Advanced biochemistry (6 credits)	Academic Year	2017
Offering Department	Biomedical Sciences	Quota	50

Course Co-ordinator Teachers Involved		o, Biomedical Science			
leacners involved	`	ao,Biomedical Science	,		
		ai,Biomedical Sciences nan,Biomedical Scienc			
	,	Y Shum,Biomedical Science	•		
Course Objectives			•	ding of molecular and cellular sig	naling in multicellula
odurse Objectives	organisms			rested in research or intending to	
Course Contents			ransduction mechanisms		
& Topics	signaling p	pathways that control	gene expression: receptors	Protein-coupled receptors: structory that activate protein tyrosine kinceptor serine kinases that activate	nases, the Ras/MAP
	The micro			actin cytoskeleton; myosin; the in	ntermediate filament
	1			transport in neuron	
	Translocat		eins - insertion into the ER;	major protein sorting pathways; f vesicular traffic; protein sorting a	
		. ,		vesicular trailic, protein sorting a	ilu processing
	Cell-cell a		matrix (ECM) junctions and	their adhesion molecules; cadh	
Course Learning			s course, students should be a	ulation of signaling molecules by	ECIVI
Outcomes		· · · · · · · · · · · · · · · · · · ·		on mechanisms that mediate cel	lular communication
5415511155		achieve a plethora of	· ·	on mediamonio trat mediate cer	ididi communication
				gulation based on their understan	ding of cytoskeleton
				and sorting pathways, and cell-	0 ,
	ad	hesion	7.	31	
	CLO 3 de	velop critical thinking	and analytical skills		
Pre-requisites	Pass in BI	OC3601 or BIOL3401	or BIOL3402 or BIOL3404		
(and Co-requisites and Impermissible combinations)					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 -	2019 : Y	Examination	Dec
Grade Descriptors	A			level of extensive knowledge and skills re	
(A+ to F)		course learning outcomes knowledge to a wide rang	<ul> <li>Show strong critical thinking and ar e of complex, familiar and unfamiliar</li> </ul>	nalytical skills, with evidence of original th situations.	ought, and ability to apply
	В			rledge and skills required for attaining at alytical skills, and ability to apply knowle	
	С			ge and skills required for attaining mos	
	D	Demonstrate partial but li Show evidence of some	mited command of knowledge and s	ical skills, and ability to apply knowledge t skills required for attaining some of the c nalytical skills. Show limited ability to a	ourse learning outcomes.
	Fail			and skills required for attaining the course pility to apply knowledge to solve problem	
Course Type	Lecture-ba	ased course	,	,,	
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading /	Self study			100
	Methods		Details	Weighting in final course grade (%)	Assessment Methods
				course grade (70)	
		ents		. ,	to CLO Mapping
Assessment Methods and Weighting	Assignme Examinati			30 70	

BIOC4611	Advanced biochemistry II (6 credits)	Academic Year	2017
Offering Department	Biomedical Sciences	Quota	50
Course Co-ordinator	Prof D Chan, Biomedical Sciences (chand@hku.hk)		
Teachers Involved	(Dr C M Qian,Biomedical Sciences) (Dr J Tanner,Biomedical Sciences) (Dr M Kotaka,Physiology) (Dr N S Wong,Biomedical Sciences) (Prof D Chan,Biomedical Sciences)		
Course Objectives	This course is aim at providing students with an up-to-date knowledge of pro structure and disease; realizing the importance of kinetics in cellular fun technological advances in the characterization of macromolecules.		
Course Contents & Topics	Topics including protein folding and misfolding in diseases; conformation of prochanges in protein function; catalytic mechanisms of enzymes and enzyme characterization of macromolecules using X-ray crystallography, nuclear spectroscopy methods; protein engineering and therapeutic approaches targeti	kinetics; biomolec magnetic resona	ular interactions; ance and other
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe how protein structures inform functions  CLO 2 recognize the roles of enzyme kinetics in cellular functions  CLO 3 derive structural information of macromolecules from experimental data		

		apply their knowledge of applied research	n protein engineering and	I therapeutics, and on experimental of	designs in basic and
Pre-requisites (and Co-requisites and Impermissible combinations)		BIOC3601; and BIOL34 BIOC4610, or already e	•		
Offer in 2017 - 2018	N O	ffer in 2018 - 2019 : N		Examination	
Grade Descriptors (A+ to F)	Α	enzyme function and in	terpretation of data; effectual	informs function; clear evidence of ability to a demonstration of applying knowledge to anization of information for presentation and c	the design of scientific
	В	interpretation of data; cap		<ul> <li>r; evidence of ability to recognize mechanism knowledge to the design of scientific methodod d communication.</li> </ul>	
	С	interpretation of data; so		ne evidence of ability to recognize mechanism applying knowledge to the design of scient d communication.	
	D	function and interpretation		inction; limited evidence of ability to recognize ion of applying knowledge to the design of sci and communication.	
	Fail	interpretation of data; su		ction; lack of ability to recognize mechanisms ying knowledge to the design of scientific m nmunication.	
Course Type	Lecture-l	based course			
Course Teaching	Activitie	es	Details		No. of Hours
& Learning Activities	Lectures	3			36
	Tutorials	3			12
	Reading	/ Self study			100
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	nents		30	CLO 1,2,3,4
	Examina	ation		70	CLO 1,2,3,4
Required/recommended reading and online materials		eeman, New York.	Mechanism in Protein Sci	ence: A Guide to Enzyme Catalysis	and Protein Folding.

BIOC4612	Molecu	ular biology of t	the gene (6 credits)		Academic Year	r 2017
Offering Department	Biomedi	ical Sciences	· ·		Quota	50
Course Co-ordinator	Prof K S	E Cheah, Biomed	lical Sciences (hrmbdkc@hku.hk)			
Teachers Involved	(Dr R K (Prof K	Yao,Biomedical Sci Ng,Biomedical Sci S E Cheah,Biomed J Zhou,Biomedical	ences) ´ dical Sciences)			
Course Objectives	To prov		knowledge of molecular biology, e	specially with resp	ect to the regula	ation of eukaryotion
Course Contents & Topics	This is function	a comprehensive	e course covering many detailed irse an understanding of how gene be gained.			
Course Learning	On succ	cessful completion	of this course, students should be a	able to:		
Outcomes			anisms for regulation of transcriptio			
		explain how cellula multiple levels	ar homeostasis can be maintained	by a combination	of controls of g	ene expression at
			chy of gene expression regulation i		evelopmental pro	ocesses
			ntal results in gene regulation studi			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	BIOC3601 or BIOL	.3401 or BIOL3402 or BIOL3404 or	r BBMS2007		
Offer in 2017 - 2018	Y 2	nd sem Offer in 2	2018 - 2019 : Y		Examination	May
Offer in 2017 - 2018 Grade Descriptors (A+ to F)	A Demonstrates a deep and comprehensive understanding of the regulation of eukaryotic gene expression and its relevance to disease and effectively relates the knowledge to developmental processes. Uses skill and insight to analyse and interpret experimental data from gene regulation studies.					iviay
	Α	disease and effect experimental data	eep and comprehensive understanding of t tively relates the knowledge to developme from gene regulation studies.	ental processes. Uses	otic gene expressio skill and insight to	on and its relevance to analyse and interpret
	В	disease and effect experimental data Demonstrates a co	eep and comprehensive understanding of t tively relates the knowledge to developme from gene regulation studies. ompetent grasp of the key concepts in the to link the knowledge to developmental pr	ental processes. Uses e regulation of eukaryo	otic gene expression skill and insight to the still gene expression	on and its relevance to analyse and interpret an and its relevance to
		disease and effec experimental data : Demonstrates a c disease and is able gene regulation stu Demonstrates a b sometimes able to	eep and comprehensive understanding of t tively relates the knowledge to developme from gene regulation studies. ompetent grasp of the key concepts in the e to link the knowledge to developmental pr idies. or relate the knowledge to developmental	ental processes. Uses e regulation of eukaryo ocesses. Correctly analyo ukaryotic gene express	otic gene expression skill and insight to to tit gene expression yees and interprets of the tit gene and its relevant to the tit gene expression and its relevant to the tit general tits and the tits relevant to the tits general tits and tits relevant to the tits general tits ge	on and its relevance to analyse and interpret in and its relevance to experimental data from nice to disease and is
	В	disease and effec experimental data Demonstrates a co disease and is ablo gene regulation stu Demonstrates a b sometimes able to experimental data Demonstrates a s	eep and comprehensive understanding of tively relates the knowledge to developme from gene regulation studies. ompetent grasp of the key concepts in the to link the knowledge to developmental prudies.	e regulation of eukaryo ocesses. Correctly analyukaryotic gene express processes. Displays a	otic gene expression skill and insight to stitic gene expression yes and interprets of sion and its relevant limited capacity to sion and rarely relations.	on and its relevance to analyse and interpret in and its relevance to experimental data from noce to disease and is analyse and interpret tes the information to
(A+ to F)	B C D	disease and effec experimental data Demonstrates a codisease and is ablo gene regulation str. Demonstrates a b sometimes able to experimental data Demonstrates a s developmental pro studies.  Demonstrates incodevelopmental pro developmental pro developmental pro studies.	eep and comprehensive understanding of tively relates the knowledge to development from gene regulation studies. ompetent grasp of the key concepts in the to link the knowledge to developmental prudies. The concepts in the test of the regulation of e or leate the knowledge to developmental from gene regulation studies. Implistic knowledge of the regulation of e	e regulation of eukaryo ocesses. Correctly analyo ukaryotic gene express processes. Displays a ukaryotic gene express is rarely able to interprulation of gene express	otic gene expression skill and insight to the skill and insight to the skill and insight to the skill and interprets of the skill and its relevant limited capacity to the skill and rarely related the experimental datasets and is unable skill and insurable.	on and its relevance to analyse and interpret in and its relevance to experimental data from once to disease and is analyse and interpret tes the information to a from gene regulation
(A+ to F)	B C D Fail Lecture-	disease and effec experimental data Demonstrates a codisease and is ablo gene regulation str. Demonstrates a b sometimes able to experimental data Demonstrates a s developmental pro studies.  Demonstrates incodevelopmental pro-based course	eep and comprehensive understanding of tively relates the knowledge to developme from gene regulation studies.  ompetent grasp of the key concepts in the to link the knowledge to developmental prudies.  assic understanding of the regulation of eto relate the knowledge to developmental from gene regulation studies.  implistic knowledge of the regulation of etoesses. Displays weak analytical skills and omplete or incorrect knowledge of the reguesses. Unable to analyse or interpret expenses.	e regulation of eukaryo ocesses. Correctly analyo ukaryotic gene express processes. Displays a ukaryotic gene express is rarely able to interprulation of gene express	otic gene expression skill and insight to the skill and insight to the skill and insight to the skill and interprets of the skill and its relevant limited capacity to the skill and rarely related the experimental datasets and is unable skill and insurable.	on and its relevance to analyse and interpret in and its relevance to experimental data from nice to disease and is analyse and interpret tes the information to a from gene regulation to relate the ideas to
(A+ to F)  Course Type Course Teaching	B C D Fail Lecture- Activiti	disease and effec experimental data Demonstrates a c disease and is able gene regulation st. Demonstrates a b sometimes able to experimental data Demonstrates a s developmental pro studies. Demonstrates incc developmental pro-based course	eep and comprehensive understanding of tively relates the knowledge to development from gene regulation studies. ompetent grasp of the key concepts in the to link the knowledge to developmental prudies. wasic understanding of the regulation of e or relate the knowledge to developmental from gene regulation studies. implistic knowledge of the regulation of excesses. Displays weak analytical skills and omplete or incorrect knowledge of the regulation than the control of the regulation of excesses.	e regulation of eukaryo ocesses. Correctly analyo ukaryotic gene express processes. Displays a ukaryotic gene express is rarely able to interprulation of gene express	otic gene expression skill and insight to the skill and insight to the skill and insight to the skill and interprets of the skill and its relevant limited capacity to the skill and rarely related the experimental datasets and is unable skill and insurable.	on and its relevance to analyse and interpret in and its relevance to experimental data from noce to disease and is analyse and interpret tes the information to a from gene regulation to relate the ideas to
(A+ to F)  Course Type Course Teaching	B C D Fail Lecture- Activiti Lecture	disease and effec experimental data Demonstrates a codisease and is ablegene regulation students and the demonstrates a become to be sometimes able to experimental data Demonstrates a sevelopmental prostudies.  Demonstrates incodevelopmental prodevelopmental pr	eep and comprehensive understanding of tively relates the knowledge to developme from gene regulation studies.  ompetent grasp of the key concepts in the to link the knowledge to developmental prudies.  assic understanding of the regulation of eto relate the knowledge to developmental from gene regulation studies.  implistic knowledge of the regulation of etoesses. Displays weak analytical skills and omplete or incorrect knowledge of the reguesses. Unable to analyse or interpret expenses.	e regulation of eukaryo ocesses. Correctly analyo ukaryotic gene express processes. Displays a ukaryotic gene express is rarely able to interprulation of gene express	otic gene expression skill and insight to the skill and insight to the skill and insight to the skill and interprets of the skill and its relevant limited capacity to the skill and rarely related the experimental datasets and is unable skill and insurable.	on and its relevance to analyse and interpret in and its relevance to experimental data from the to disease and is analyse and interpret tes the information to a from gene regulation to relate the ideas to the total from the total
(A+ to F)  Course Type Course Teaching	B C D Fail Lecture- Activiti Lecture Tutorial	disease and effec experimental data Demonstrates a c disease and is able gene regulation stu. Demonstrates a b sometimes able trexperimental data Demonstrates a s developmental pro studies. Demonstrates incodevelopmental pro-based course	eep and comprehensive understanding of tively relates the knowledge to developme from gene regulation studies.  ompetent grasp of the key concepts in the to link the knowledge to developmental prudies.  assic understanding of the regulation of eto relate the knowledge to developmental from gene regulation studies.  implistic knowledge of the regulation of etoesses. Displays weak analytical skills and omplete or incorrect knowledge of the reguesses. Unable to analyse or interpret expenses.	e regulation of eukaryo ocesses. Correctly analyo ukaryotic gene express processes. Displays a ukaryotic gene express is rarely able to interprulation of gene express	otic gene expression skill and insight to the skill and insight to the skill and insight to the skill and interprets of the skill and its relevant limited capacity to the skill and rarely related the experimental datasets and is unable skill and insurable.	on and its relevance to analyse and interpret on and its relevance to experimental data from the control of the
Course Type Course Teaching & Learning Activities	B C D Fail Lecture- Activiti Lecture Tutorial Reading	disease and effec experimental data Demonstrates a codisease and is ablegene regulation st. Demonstrates a become the experimental data Demonstrates as developmental prostudies. Demonstrates incodevelopmental probased course is s	eep and comprehensive understanding of tively relates the knowledge to developme from gene regulation studies.  ompetent grasp of the key concepts in the to link the knowledge to developmental prudies.  assic understanding of the regulation of e to relate the knowledge to developmental from gene regulation studies.  implistic knowledge of the regulation of e cesses. Displays weak analytical skills and complete or incorrect knowledge of the regulation the regulation that the regulation of the r	ental processes. Uses e regulation of eukaryo ocesses. Correctly analy- ukaryotic gene express processes. Displays a ukaryotic gene express i is rarely able to interpr ulation of gene express rimental data from gene	otic gene expression skill and insight to the gene expression yees and interprets of the gene expression and its relevant limited capacity to the general data and its unable regulation studies.	on and its relevance to analyse and interpret on and its relevance to experimental data from the to disease and its analyse and interpret tes the information to a from gene regulation to relate the ideas to the total from the total
Course Type Course Teaching & Learning Activities  Assessment Methods	B C D Fail Lecture- Activiti Lecture Tutorial	disease and effec experimental data Demonstrates a codisease and is ablegene regulation st. Demonstrates a become the experimental data Demonstrates as developmental prostudies. Demonstrates incodevelopmental probased course is s	eep and comprehensive understanding of tively relates the knowledge to developme from gene regulation studies.  ompetent grasp of the key concepts in the to link the knowledge to developmental prudies.  assic understanding of the regulation of eto relate the knowledge to developmental from gene regulation studies.  implistic knowledge of the regulation of etoesses. Displays weak analytical skills and omplete or incorrect knowledge of the reguesses. Unable to analyse or interpret expenses.	ental processes. Uses e regulation of eukaryo ocesses. Correctly analy- ukaryotic gene express processes. Displays a rukaryotic gene express is rarely able to interpr ulation of gene express rimental data from gene	otic gene expression skill and insight to the skill and insight to the skill and insight to the skill and interprets of the skill and its relevant limited capacity to the skill and rarely related the experimental datasets and is unable skill and insurable.	on and its relevance to analyse and interpret in and its relevance to experimental data from the control of the
	B C D Fail Lecture- Activiti Lecture Tutorial Reading	disease and effec experimental data Demonstrates a codisease and is ablegene regulation students. Demonstrates a became to experimental data. Demonstrates a sequelopmental prostudies. Demonstrates incodevelopmental probased course essistances.	eep and comprehensive understanding of tively relates the knowledge to developme from gene regulation studies.  ompetent grasp of the key concepts in the to link the knowledge to developmental prudies.  assic understanding of the regulation of e to relate the knowledge to developmental from gene regulation studies.  implistic knowledge of the regulation of e cesses. Displays weak analytical skills and complete or incorrect knowledge of the regulation the regulation that the regulation of the r	ental processes. Uses e regulation of eukaryo ocesses. Correctly analy- ukaryotic gene express processes. Displays a rukaryotic gene express is rarely able to interpr ulation of gene express rimental data from gene	otic gene expression skill and insight to the gene expression yees and interprets of the gene expression and its relevant limited capacity to the general data sion and rarely related experimental data sion and is unable regulation studies.	on and its relevance to analyse and interpret in and its relevance to experimental data from the control of the

reading and online materials

Watson JD et al. (2014) Molecular Biology of the Gene, 7th ed. Pearson/Benjamin Cummings, San Francisco.

BIOC4613	Advance credits)	ed techniques in bioc	hemistry & molecular biolog	gy (6	Academic Year	2017
Offering Department	Biomedica	Il Sciences			Quota	70
Course Co-ordinator	Prof D Cha	an, Biomedical Sciences (	(chand@hku.hk)			
Teachers Involved	(Dr J A Ta (Dr. B Gac (Dr. M C H	Wong, Biomedical Science nner, Biomedical Sciences b, Biomedical Sciences) I Cheung, Biomedical Sciences) an, Biomedical Sciences)	s) Énces)			
Course Objectives	aim is to		ased course for students majoring aining for students to pursuit pos y/industry environment.			
Course Contents & Topics	Hands-on	experiments using ad tics. Students will also h	lvanced techniques in biochem ave the opportunity to familiarize t			
Course Learning	On succes	sful completion of this cou	urse, students should be able to:			
Outcomes		plain the basic principles blogy	of current advanced techniques co	mmonly us	ed in biochemis	try and molecula
	CLO 2 ap	ply and perform these tec	chniques in other novel experiment	al settings		
	CLO 3 cri	tically evaluate experimer	ntal data			
		•	es to test or validate hypotheses			
	CLO 5 wr	ite a concise experimenta	Il report using correct terminologies	and nome	nclatures	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	OC3604				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 201	9 : Y		Examination	Dec
Grade Descriptors (A+ to F)	В	effective ability to identify prob to evaluate experimental data experimental data. Comprehensive understanding problems and generate solution	understanding of the principles and applications and generate solutions relating to apply; cohesive and systematic planning and or gof the principles and applications of advarous relating to applications in a laboratory sization of experimental design and present	olications in a rganization of nce technolog etting; evidence	laboratory setting; cl experimental design ies in biochemistry; ce of ability to evalua	ear evidence of ability of and presentation of clear ability to identify
	С	Sound understanding of the problems and generate solution	principles and applications of advance t ins relating to applications in a laboratory set organization of experimental design and p	echnologies i etting; some e	n biochemistry; sou vidence of ability to	
	D	Superficial understanding of t problems and generate solution	he principles and applications of advance tions relating to applications in a labora ence of planning and organization of experi	technologies tory setting;	in biochemistry; lim some awareness of	of ability to evaluate
	Fail	problems and generate solu	principles and applications of advance to tions relating to applications in a laborate evidence of planning and organization of	tory setting;	lack of evidence of	f ability to evaluate
Course Type	Lecture wi	th laboratory component of	course			
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Lectures					12
	Laborator	у				72
	Tutorials					6
	Reading /	Self study				76
Assessment Methods and Weighting	Methods	Ī	Details	•	ing in final grade (%)	Assessment Methods to CLO Mapping
	Assignme	nts			50	CLO 1,2,3,4,5
	Examinati		One 3-hour written examination		50	CLO 1,2,3,4
Required/recommended reading and online materials			ciples and Techniques of Bioche	emistry and	d Molecular Bio	

BIOC4966	Biochem	istry internship (6 credits)		Academic Year	2017
Offering Department	Biomedica	Sciences		Quota	20
Course Co-ordinator	Prof J D H	uang, Biomedical Sciences (jdhuang@hku.hk)			
Teachers Involved	`	nic staff in Biochemistry Major,Biomedical Sciences) uang,Biomedical Sciences)			
Course Objectives	study. The	e aims to offer students the opportunities to gain work e workplace learning experience would be of great be ne study to the real work environments. Students have n the University or outside the University arranged by th	enefit to the set to take on at	tudents to apply least 160 hours o	their knowledge
Course Contents & Topics	various tas 2. Outside be superv	ne university: The student will be supervised by a staft is as instructed by the Supervisor.  The university: The student will work in an external ager and under a staff member of the external agency (the tr/School of the student (the Internal Supervisor).	ncy related to t	he major of study	. The student will
Course Learning Outcomes	CLO 1	sful completion of this course, students should be able to recognize the strengths and limitations of their area of to examine the role of science in our society acquire problem-solving skills to solve novel and ill-defin	raining or expe	ertise	

Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2017 - 2018	including I This capst The earlie	BIOC3604. one course is for Bioch	ranced level (level 3 or 4) disciplinar memistry Major students only. wed to take this capstone course is to mer Offer in 2018 - 2019 : Y		Biochemistry Major
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by supervisor(s). the job. Successfully fulfills and evaluation by supervisof "Distinction".  Very limited or no ability to	solve problems in the workplace. Successfu Establishes effective collaboration and come the requirements set out in the Course Desor(s), etc. Students demonstrating excellents solve problems in the workplace. Fails to ha	munication with supervisor(s), circiption regarding working hours t performance in the above woundle or carry out the work require	olleagues, and clients in written and oral report, ald be awarded a grade ed in the job or assigned
			stablish effective collaboration or communica quirements set out in the Course Descripti , etc.		
Course Type	Internship				
Course Teaching	Activities	i	Details	No. of Hours	
& Learning Activities	Internship	work	it is expected that students are to (or the equivalent of 4 weeks full-t		160
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Written re	port	written report, employer's feedback and oral presentation	100	CLO 1,2,3
Additional Course Information	be record interested Enrolment	ed on the student's tra to enrol in this course s of this course is not co	surse can be counted towards the Country and the Country of the assession of the country of the assession of the country of th	sed on "Pass/Fail" basis stain the approval. ction system and should b	Students who are the made through the

BIOC4999	Bioche	emistry project (	12 credits)	Academic \	<b>/ear</b> 2017	
Offering Department	Biomedi	cal Sciences		Quota	25	
Course Co-ordinator	Dr N S V	Nong, Biomedical S	ciences (nswong@hku.hk)			
Teachers Involved		demic staff in Bioche Wong,Biomedical S	emistry Major,Biomedical Sc ciences)	iences)		
Course Objectives	commun	nication (both orally		scientific research: literature searcl nd time management. The course is nce.		
Course Contents & Topics	Project-r Experim Critical a Formula Design o	related topics in biodental methods in properties of current stion of research que of experiments.	chemistry, cell and molecula otein and nucleic acid bioche science literature estions		y.	
Course Learning	On succ	essful completion o	f this course, students shoul			
Outcomes				ned area of biochemistry and molecu	lar biology	
	CLO 2	formulate research	questions and design exper	iments to address these questions		
			experimental techniques to s	olve research problems		
			ret experimental results			
			riting skills and logically rep			
Pre-requisites and Co-requisites and Impermissible combinations)	including BIOC46	g 4 of the following 5 10 and BIOC4613 o				
Join Bill at 10113)				ne course is their year 3 study.		
Offer in 2017 - 2018		ear long Offer in 2	•	Examinatio	n No Exam	
Grade Descriptors (A+ to F)	A	knowledge. Display comprehensively ev workers to enhance and responds knowl	s tenacity and commitment, general aluated in the context of the origin practical and scientific writing skill edgeably to questions. Excellent tin		analysed with insight and a supervisor and other conditional distribution and an effective way	
	Plans and executes a detailed experimental investigation, framing the research question within existing knowledge. Works with commitment, generating a sufficient body of data that is analysed and evaluated in the context of the original research question with skill and understanding. Works constructively with a supervisor and other co-workers to enhance practical and scientific writing skills. Clearly communicates the findings to a broader audience and responds knowledgeably to most questions. Able to time-manage effectively.					
	С	commitment in orde question. Works wit	r to generate sufficient data for a re h a supervisor and other co-work	tempting to contextualize the research quest easonable analysis and evaluation in the cont ers to improve practical and scientific writing nd responds to most questions. Acceptable tim	ext of the original research skills. Communicates the	
	D	Displays minimal correluctantly with a su	mmitment when collecting data an	tigation, showing a limited ability to contextua d is only able to undertake a superficial anal- evelop practical and scientific writing skills. Dis ie. Poor time-management skills.	sis and evaluation. Works	
	Fail	Plans and execute commitment when c	s a flawed or simplistic experimollecting data and produces an inco fic writing skills. Displays weak com	ental investigation, which lacks a valid scie oherent analysis and evaluation. Works in isola imunication skills when presenting the findings	tion, thus failing to improve	
Course Type	Project-b	based course				
Course Teaching	Activitie	es	Details		No. of Hours	
Learning Activities	Reading	g / Self study			240	
Assessment Methods and Weighting	Method	•	Details	Weighting in final course grade (%)	Assessment Methods	
					to CLO Mapping	

	Oral presentation	including continuous assessment (15%)	40	CLO 5
Required/recommended reading and online materials	None prescribed			

BIOL3404	Protein s	structure and i	function (6 credits)	Academi	: Year	2017	
Offering Department	Biomedica	al Sciences	•	Quota		70	
Course Co-ordinator	Dr C M Qi	an, Biomedical S	ciences (cmqian@hku.hk)				
Teachers Involved	(Dr W K Y	tian,Biomedical S ip,Biological Scie / M Lee,Biologica	ences)				
Course Objectives	To provide	e students with a for study of both.	a good understanding of proteing.  This course provides a strong				
Course Contents & Topics	quaternary The relation specificity; Methods for Enzymolog molecular Protein purseparation purity, opti	y structures; onship of protein; or protein structur gy: enzyme non mechanisms of c urification and cha n techniques, met	aracterization: various liquid chr thods of determination of molecu rotein determination, ultracentrif	ar motifs, binding and recognition graphy and nuclear magnetic reletics and energetics of bindirumatographical methods and the lar mass, activity and	n, enz sonan g, tra eir use	yme catalysis and ce; nsition state and es in combination	
Course Learning	On succes	ssful completion o	of this course, students should b	e able to:			
Outcomes	CLO 1 fu	undamental unde	rstanding of principles of protein	structure			
	CLO 2 d	lemonstrate a bas	sic understanding of the relation	ship between protein structure a	nd fun	nction	
			nethods for enzymes	·			
	CLO 4 find out kinetic parameters of proteins or enzymes by graphical techniques						
	CLO 5 learn about the ways to purify protein and the many industrial uses of proteins						
Pre-requisites			ays to purify protein and the mar 2220 or MEDE2301				
(and Co-requisites and Impermissible combinations)	Pass in BI	OC2600 or BIOL	2220 or MEDE2301	y industrial uses of proteins			
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018	Pass in BI	OC2600 or BIOL	2220 or MEDE2301 018 - 2019 : Y	y industrial uses of proteins  Examinat		May	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018	Pass in BI	OC2600 or BIOL  sem Offer in 2  1. Exceptionally god scientific literature.	2220 or MEDE2301  018 - 2019 : Y od performance demonstrating comprel 3. Superior writing and group communic	y industrial uses of proteins  Examinal tensive understanding of the subject materials attention skills.	itter. 2.	Critical insight into the	
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Pass in BI	Sem Offer in 2  1. Exceptionally gos scientific literature.  1. Good performaning Good writing and gr	2220 or MEDE2301  018 - 2019 : Y  od performance demonstrating compret 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills.	Examination skills.  The subject matter. 2. Coherent insight	itter. 2.	Critical insight into the scientific literature. 3	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in BI	I sem Offer in 2  1. Exceptionally gor scientific literature.  1. Good performani Good writing and gr  1. Satisfactory perf literature. 3. Adequa  1. Limited performa	2220 or MEDE2301  018 - 2019 : Y od performance demonstrating compret 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding	Examination skills.  the subject matter. 2. Coherent insight erstanding of the subject matter. 2. So	itter. 2. into the ome ins	Critical insight into the scientific literature. 3 ight into the scientific	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd A B C	Sem Offer in 2  1. Exceptionally gor scientific literature. 1. Good performan. Good writing and gr 1. Satisfactory perfliterature. 3. Adequation 1. Limited performa. 3. Limited writing and 3. Limited writing arms.	2220 or MEDE2301  018 - 2019 : Y od performance demonstrating comprel 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills	Examinate the subject matter. 2. Some ability of basic subject matter. 2. Some ability	into the ome ins	Critical insight into the scientific literature. 3 ight into the scientific the scientific literature	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Y 2nd A B C D Fail	Sem Offer in 2  1. Exceptionally gor scientific literature. 1. Good performan. Good writing and gr 1. Satisfactory perfliterature. 3. Adequation 1. Limited performa 3. Limited writing ar 1. Poor understandi	2220 or MEDE2301  018 - 2019 : Y  od performance demonstrating compret 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills unce demonstrating some understanding nd group collaboration skills.	Examinate the subject matter. 2. Some ability of basic subject matter. 2. Some ability	into the ome ins	Critical insight into the scientific literature. 3 ight into the scientific the scientific literature	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Y 2nd A B C D Fail Lecture-ba	I sem Offer in 2  1. Exceptionally goscientific literature. 1. Good performant Good writing and gr 1. Satisfactory perfilterature. 3. Adequa 1. Limited performa 3. Limited writing ar 1. Poor understandiased course	2220 or MEDE2301  018 - 2019 : Y  od performance demonstrating compret 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding nd group collaboration skills. ing of subject matter. 2. Little to no insig	Examinate the subject matter. 2. Some ability of basic subject matter. 2. Some ability	into the ome ins	Critical insight into the scientific literature. 3 ight into the scientific the scientific literature to write or collaborate.	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 2nd A B C D Fail Lecture-ba Activities	I sem Offer in 2  1. Exceptionally goscientific literature. 1. Good performant Good writing and gr 1. Satisfactory perfilterature. 3. Adequa 1. Limited performa 3. Limited writing ar 1. Poor understandiased course	2220 or MEDE2301  018 - 2019 : Y  od performance demonstrating compret 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills unce demonstrating some understanding nd group collaboration skills.	Examinate the subject matter. 2. Some ability of basic subject matter. 2. Some ability	into the ome ins	Critical insight into the scientific literature. 3 ight into the scientific the scientific literature to write or collaborate.  No. of Hours	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 2nd A B C D Fail Lecture-ba Activities Lectures	I sem Offer in 2  1. Exceptionally goscientific literature. 1. Good performant Good writing and gr 1. Satisfactory perfilterature. 3. Adequa 1. Limited performa 3. Limited writing ar 1. Poor understandiased course	2220 or MEDE2301  018 - 2019 : Y  od performance demonstrating compret 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding nd group collaboration skills. ing of subject matter. 2. Little to no insig	Examinate the subject matter. 2. Some ability of basic subject matter. 2. Some ability	into the ome ins	Critical insight into the scientific literature. 3 ight into the scientific the scientific literature to write or collaborate.  No. of Hours  36	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials	I sem Offer in 2  1. Exceptionally goscientific literature. 1. Good performant Good writing and gr I. Satisfactory perfliterature. 3. Adequa 1. Limited performa 3. Limited writing ar 1. Poor understandi ased course	2220 or MEDE2301  018 - 2019 : Y  od performance demonstrating compret 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding nd group collaboration skills. ing of subject matter. 2. Little to no insig	Examinate the subject matter. 2. Some ability of basic subject matter. 2. Some ability	into the ome ins	Critical insight into the scientific literature. 3 ight into the scientific literature to write or collaborate.  No. of Hours 36 12	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading /	I sem Offer in 2  1. Exceptionally goscientific literature. 1. Good performant Good writing and gr 1. Satisfactory perfilterature. 3. Adequa 1. Limited performa 3. Limited writing ar 1. Poor understandiased course	2220 or MEDE2301  018 - 2019 : Y od performance demonstrating compref 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding nd group collaboration skills. ing of subject matter. 2. Little to no insig    Details	Examinal uses of proteins  Examinal tensive understanding of the subject matter ation skills. The subject matter are subject matter. 2. Some ability of basic subject matter. 2. Some ability the into use of the scientific literature. 3.	into the ome ins to use	Critical insight into the scientific literature. 3 ight into the scientific literature to write or collaborate No. of Hours 36 12 100	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials	I sem Offer in 2  1. Exceptionally goscientific literature. 1. Good performant Good writing and gr I. Satisfactory perfliterature. 3. Adequa 1. Limited performa 3. Limited writing ar 1. Poor understandi ased course	2220 or MEDE2301  018 - 2019 : Y  od performance demonstrating compret 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding nd group collaboration skills. ing of subject matter. 2. Little to no insig	Examinate the subject matter. 2. Some ability of basic subject matter. 2. Some ability	into the ome ins to use Unable t	Critical insight into the scientific literature. 3 ight into the scientific literature to write or collaborate.  No. of Hours  36  12  100  Assessment Methods	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading /	I sem Offer in 2  1. Exceptionally gord scientific literature. 1. Good performant Good writing and gr 1. Satisfactory perfilterature. 3. Adequation 1. Limited performation 3. Limited writing articles are decoursed to the second seed course in the second second seed course in the second	2220 or MEDE2301  018 - 2019 : Y od performance demonstrating compref 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding nd group collaboration skills. ing of subject matter. 2. Little to no insig    Details	Examinal uses of proteins  Examinal tensive understanding of the subject matter ation skills. The subject matter are standing of the subject matter. 2. Some ability of basic subject matter. 2. Some ability the into use of the scientific literature. 3. Weighting in fin	into the ome ins to use Unable t	Critical insight into the scientific literature. 3 sight into the scientific literature to write or collaborate.  No. of Hours 36 12 100 Assessment	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods	I sem Offer in 2  1. Exceptionally go scientific literature. 1. Good performand Good writing and gr 1. Satisfactory perfilterature. 3. Adeque 1. Limited performa 3. Limited writing ar 1. Poor understandi ased course  (Self study	2220 or MEDE2301  018 - 2019 : Y od performance demonstrating compref 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding nd group collaboration skills. ing of subject matter. 2. Little to no insig    Details	Examinal ensive understanding of the subject matter. 2. Coherent insight erstanding of the subject matter. 2. Some ability of basic subject matter. 2. Some ability ht into use of the scientific literature. 3.  Weighting in fin course grade (%)	into the ome ins to use Unable t	Critical insight into the scientific literature. 3 ight into the scientific the scientific literature to write or collaborate.  No. of Hours 36 12 100 Assessment Methods to CLO Mapping	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in BI  Y 2nd  A  B  C  D  Fail  Lecture-ba  Activities  Lectures  Tutorials  Reading /  Methods  Assignment  Examination	I sem Offer in 2  1. Exceptionally go scientific literature. 1. Good performan Good writing and gr 1. Satisfactory perf literature. 3. Adequa 1. Limited performa 3. Limited writing an 1. Poor understandiased course  7 Self study  2 sents ion	2220 or MEDE2301  018 - 2019 : Y od performance demonstrating compref 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding nd group collaboration skills. ing of subject matter. 2. Little to no insig  Details	Examinat ensive understanding of the subject matter. 2. Coherent insight erstanding of the subject matter. 2. Some ability of basic subject matter. 2. Some ability int into use of the scientific literature. 3.  Weighting in fin course grade (%	into the ome ins to use Unable t	Critical insight into the scientific literature. 3 sight into the scientific literature to write or collaborate  No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Pass in BI  Y 2nd  A  B  C  D  Fail  Lecture-ba  Activities  Lectures  Tutorials  Reading /  Methods  Assignme  Examinati  None pres  To be ann	I sem Offer in 2  1. Exceptionally go scientific literature. 1. Good performan Good writing and gr I. Satisfactory perf literature. 3. Adequa 1. Limited performa 3. Limited writing ar 1. Poor understandi ased course  3. Self study  2. Self study  3. Self study	2220 or MEDE2301  018 - 2019 : Y od performance demonstrating compref 3. Superior writing and group communic ce demonstrating full understanding of roup collaboration skills. formance demonstrating adequate und ate writing and group collaboration skills ince demonstrating some understanding nd group collaboration skills. ing of subject matter. 2. Little to no insig  Details	Examinal lensive understanding of the subject matter. 2. Coherent insight erstanding of the subject matter. 2. Some ability of basic subject matter. 2. Some ability in tinto use of the scientific literature. 3. Weighting in fin course grade (% 30 70	titter. 2.	Critical insight into the scientific literature. Sight into the scientific literature to write or collaborate  No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5	

BIOL1110	From m	nolecules to cells (6	credits)	Academic Yea	r  2017	
Offering Department		l Sciences		Quota	420	
Course Co-ordinator	Prof B K	C Chow, Biological Scie	nces (bkcc@hku.hk)			
Teachers Involved		C Lo, Biological Sciences	- · · · · · · · · · · · · · · · ·			
		Zhang, Biological Science				
	,	Y Yuen, Biological Scien	•			
		C Chow, Biological Scient				
Course Objectives	_ `			of the biology of molecules and cel	ls to undernin late	
oourse objectives	This course aims to provide basic conceptual understanding of the biology of molecules and cells to underpin late studies in applied biology, genetics, biochemistry, nutrition, biotechnology, microbiology, plant and anima physiology and developmental biology.					
Course Contents		An issue-based approach will be adopted to enable students to integrate basic concepts in molecules and cells are				
& Topics	to inspire	further investigation thr		temporary biological issues. The co		
			•	ents? What is the central dogma of and sexuality? Why is that children	0,	
	Metabolis	sm and Health: How are	· ·	on-functional or mutated? ? Do all humans have the same die	tary requirements	
	,	't we live without plants?		a cell? How do cells communication	ata and assamble	
	themselv	es to form tissues and	organs? What is a cell cycle	e and how it is regulated? What hat themselves for differentiation?		
				an genes be modified? Is gene the	erapy the future o	
		s? Is genetically modifie	9,	n? What are the Genome Projects		
Course Learning	On succe	essful completion of this	course, students should be			
Outcomes	li	ving organism		enome and the inherited phenotype		
				ene can lead to the development of		
				lecules in relationship to good healt		
	CLO 4 describe various stages in a cell division and that disturbance of this process may result in cancer development					
		lescribe concepts used i now some applications		ne therapy and production of genetion	cally modified food	
Pre-requisites	NIL					
(and Co-requisites	Students	who wish to take thi	s course are expected to	have taken HKDSE Biology and	d/or Chemistry or	
and Impermissible	equivaler	nt. For students withou	t HKDSE Chemistry, they a	are encouraged to take CHEM104	11 concurrently of	
combinations)	before.					
Offer in 2017 - 2018	Y 1s	t sem 2nd sem Offei	r in 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	Α			tensive knowledge required for attaining a gical thinking, with evidence of original thou		
(1. 10.1)	knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational skills. Writings consistently demonstrate informed, thoughtful intellectual engagement with broad range of relevant concepts.					
	B Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills. Writings mostly demonstrate informed, thoughtful intellectual					
	engagement with broad range of relevant concepts.					
	C	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills. Writings mostly indicate informed, intellectual engagement with concepts or				
	theories but not always with sufficient depth, breadth or understanding.  Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show					
	D Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational skills. Writings indicate some intellectual engagement with concepts or theories but mostly at a superficial level.					
	Fail			cial level. ge required for attaining the course learni	ng outcomes. Lack of	
	ı alı	analytical and critical abilit	ies, logical and coherent thinking. Sinimally effective or ineffective. Wr	Show very little or no ability to apply knowle ritings reveal an absence of intellectual engi	dge to solve problems.	
Course Type	Lecture-h	pased course				
Course Teaching	Activitie		Details		No. of Hours	
Learning Activities	Lectures		Dottung		36	
= Louining / totivitio					12	
	Tutorials				100	
Nananamant Mathau		/ Self study	Detelle	14/		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	ation		60	CLO 1,2,3,4,5,6	
	Test	AUO11		40		
Caa Wak-!4-		adla blev ble/		40	CLO 1,2,3,4,5,6	
Course Website		odle.hku.hk/				
Additional Course		1st Semester: 210				
Information		2nd Semester: 210				

BIOL1111	Introductory microbiology (6 credits)	Academic Year	2017		
Offering Department	Biological Sciences	Quota	80		
Course Co-ordinator	, Biological Sciences ()				
Teachers Involved	(,Biological Sciences)				
Course Objectives	To introduce students to the diversity and function of microorganisms; and relate this to their importance in the natural environment, disease and public health, food production and spoilage and the biotechnology industry.				
Course Contents & Topics	Evolutionary diversity of bacteria, archaea, eukarya and viruses; Metabolic strategies, cell biology and genetics; Microbial ecology, marine microbiology, terrestrial microbiology; Microbial interactions with animals and plants; The human microbiome; Medical microbiology and immunology; Biotechnology applications; Food spoilage and food fermentations.				
Course Learning	On successful completion of this course, students should be able to:				

Outcomes	CLO 1 describe the key features of the major microbial phyla and place them in an evolutionary context					
	CLO 2	explain the major physiolo compare the similarities ar		sses in prokaryotes and eukaryotic r hese two domains	nicroorganisms and	
	CLO 3	identify the microorganism food production and spoila		e in ecological processes, human dis	ease and medicine,	
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2017 - 2018	N C	Offer in 2018 - 2019 : N		Examination		
Grade Descriptors (A+ to F)	A	reading or research is evidence	ent. Ideas show an exception	e addressed. Organization of ideas and clarity al understanding of concepts. Arguments ar entation is highly creative and appealing.		
	В					
	С	an effective understanding of concepts. Arguments identify major issues. Presentation is appealing but may lack clarity.				
	D	incomplete understanding of concepts. Arguments are not persuasive. Presentation lacks creativity or is not appealing.				
	Fail (<45%) Unacceptable. Inability to identify major criteria. Very weak organization of ideas and clarity. Ideas show a lack of understanding of concepts. No coherent argument. Presentation lacks creativity or is unappealing.					
Course Type	Lecture	with laboratory componen	t course			
Course Teaching	Activit	ies	Details		No. of Hours	
& Learning Activities	Lecture	es			24	
	Laboratory				24	
	Tutoria	ls			6	
	Readin	g / Self study			100	
Assessment Methods and Weighting	Metho	ds	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examir	nation		70	CLO 1,2,3	
	Laboratory reports			30	CLO 3	
Required/recommended reading and online materials	Brock E 576.B86		, Pearson Benjamin Cu	ummings, 12th Edition, 2009 [HKU	library call number	
Course Website	http://m	oodle.hku.hk/				

BIOL1201	Introdu	Introduction to food and nutrition (6 credits)  Academic Year   2017				
Offering Department	Biologica	l Sciences	•	Quota	190	
Course Co-ordinator	Dr J W F	Dr J W F Wan, Biological Sciences (jmfwan@hku.hk)				
Teachers Involved	(Dr J F Wan,Biological Sciences) (Dr K W Cheng,Biological Sciences) (Dr L Zhang,Biological Sciences)					
Course Objectives	field to t productio nutrition a This is ar	To enable student to appreciate the multidisciplinary nature of the study of Food and Nutrition. From the farmer's field to the dinner table, a basic understanding of the general properties of macro and micronutrients food production, processing and storage will be covered. Food safety, food selection behaviour as well as balanced nutrition as part of life style instrumental to good health will be discussed.  This is an independent course which can be taken by students from various disciplines. It also prepares students for further studies in Food and Nutritional Science.				
Course Contents & Topics	Topics w safety an	vill include food com d regulation; determ	position and functional properties inants of food choice; examples of hts; diet and disease relationship.			
Course Learning	On succe	essful completion of	this course, students should be able	e to:		
Outcomes	CLO 1	understand the key	components of food and be able to	discuss their functional proper	ties	
	CLO 2	understand the sign	ificance of food safety and be able	to identify sources of contamin	ation	
	CLO 3 understand the concept of a balanced diet					
	CLO 4	critically assess hea	Ith problems associate with malnut	rition		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2017 - 2018	Y 1st	t sem Offer in 2018		Examination		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough grasp of the subject matter covered. Show exceptional ability to articulate concepts and integrate knowledge. Demonstrate highly effective organization / writing skills.				
(A+ to F)	B Demonstrate substantial grasp of the subject matter covered. Show full capacity to use the appropriate concepts and assimilate the materials to solve problems. Demonstrate effective organization / writing skills.					
		the materials to solve	ate highly effective organization / writing skil ial grasp of the subject matter covered. Sho problems. Demonstrate effective organization	ow full capacity to use the appropriate on / writing skills.	concepts and assimilate	
	C	the materials to solve Demonstrate general problems. Demonstrate	ate highly effective organization / writing skil ial grasp of the subject matter covered. Sh- problems. Demonstrate effective organization but incomplete grasp of the subject matter e adequate organization / writing skills.	ow full capacity to use the appropriate on / writing skills. ter covered. Show ability to apply co	concepts and assimilate	
		the materials to solve Demonstrate general problems. Demonstrat Demonstrate partial Misunderstanding of the basic organization / wi	ate highly effective organization / writing skil ial grasp of the subject matter covered. She problems. Demonstrate effective organization but incomplete grasp of the subject matter adequate organization / writing skills. but limited grasp, with retention of so he materials is not uncommon. Ability to appriting skills.	ow full capacity to use the appropriate on / writing skills. ter covered. Show ability to apply or ome relevant information, of the si- ply concepts and solve simple problem	concepts and assimilate oncepts to solve simple ubject matter covered. Is is limited. Demonstrate	
	C D Fail	the materials to solve Demonstrate general problems. Demonstrat Demonstrate partial Misunderstanding of ti basic organization / w Demonstrate little or concepts and show m	ate highly effective organization / writing skil ial grasp of the subject matter covered. Shi problems. Demonstrate effective organization but incomplete grasp of the subject matter that deduate organization / writing skills. but limited grasp, with retention of so he materials is not uncommon. Ability to app	ow full capacity to use the appropriate on / writing skills. ter covered. Show ability to apply or ome relevant information, of the supply concepts and solve simple problem information, of the subject matter cov	concepts and assimilate oncepts to solve simple ubject matter covered. Is is limited. Demonstrate ered. Fail to understand	
	C D Fail	the materials to solve Demonstrate general problems. Demonstrat Demonstrate partial Misunderstanding of ti basic organization / w Demonstrate little or	ate highly effective organization / writing skil ial grasp of the subject matter covered. Ship problems. Demonstrate effective organization but incomplete grasp of the subject matter adequate organization / writing skills. but limited grasp, with retention of so he materials is not uncommon. Ability to appriting skills.  no grasp, with retention of little relevant in grasp, with retention of some materials is not uncommon.	ow full capacity to use the appropriate on / writing skills. ter covered. Show ability to apply or ome relevant information, of the supply concepts and solve simple problem information, of the subject matter cov	concepts and assimilate oncepts to solve simple ubject matter covered. Is is limited. Demonstrate ered. Fail to understand	
Course Teaching	C D Fail	the materials to solve Demonstrate general problems. Demonstrat Demonstrate partial Misunderstanding of ti basic organization / w Demonstrate little or concepts and show m Dassed course	ate highly effective organization / writing skil ial grasp of the subject matter covered. Ship problems. Demonstrate effective organization but incomplete grasp of the subject matter adequate organization / writing skills. but limited grasp, with retention of so he materials is not uncommon. Ability to appriting skills.  no grasp, with retention of little relevant in grasp, with retention of some materials is not uncommon.	ow full capacity to use the appropriate on / writing skills. ter covered. Show ability to apply or ome relevant information, of the supply concepts and solve simple problem information, of the subject matter cov	concepts and assimilate oncepts to solve simple ubject matter covered. Is is limited. Demonstrate ered. Fail to understand	
Course Teaching	C D Fail Lecture-b	the materials to solve Demonstrate general problems. Demonstrat Demonstrate partial Misunderstanding of ti basic organization / w Demonstrate little or concepts and show m Dassed course	ate highly effective organization / writing skil ial grasp of the subject matter covered. Ship problems. Demonstrate effective organization but incomplete grasp of the subject matter adequate organization / writing skills. but limited grasp, with retention of so he materials is not uncommon. Ability to appriting skills.  no grasp, with retention of little relevant in inimal competence in problem solving. Dem	ow full capacity to use the appropriate on / writing skills. ter covered. Show ability to apply or ome relevant information, of the supply concepts and solve simple problem information, of the subject matter cov	concepts and assimilate oncepts to solve simple ubject matter covered. Is is limited. Demonstrate ered. Fail to understand skills.  No. of Hours 36	
Course Teaching	C D Fail Lecture-b Activitie	the materials to solve Demonstrate general problems. Demonstrat Demonstrate partial Misunderstanding of ti basic organization / wi Demonstrate little or concepts and show m passed course	ate highly effective organization / writing skil ial grasp of the subject matter covered. Ship problems. Demonstrate effective organization but incomplete grasp of the subject matter adequate organization / writing skills. but limited grasp, with retention of so he materials is not uncommon. Ability to appriting skills.  no grasp, with retention of little relevant in inimal competence in problem solving. Dem	ow full capacity to use the appropriate on / writing skills. ter covered. Show ability to apply or ome relevant information, of the supply concepts and solve simple problem information, of the subject matter cov	concepts and assimilate oncepts to solve simple ubject matter covered. Is is limited. Demonstrate ered. Fail to understand skills.	
Course Type Course Teaching & Learning Activities	Fail Lecture-b Activitie Lectures Tutorials	the materials to solve Demonstrate general problems. Demonstrat Demonstrate partial Misunderstanding of ti basic organization / wi Demonstrate little or concepts and show m passed course	ate highly effective organization / writing skil ial grasp of the subject matter covered. Shiproblems. Demonstrate effective organizatic but incomplete grasp of the subject matte adequate organization / writing skills. but limited grasp, with retention of so he materials is not uncommon. Ability to appriting skills. no grasp, with retention of little relevant in inimal competence in problem solving. Dem	ow full capacity to use the appropriate on / writing skills. ter covered. Show ability to apply or ome relevant information, of the supply concepts and solve simple problem information, of the subject matter cov	concepts and assimilate oncepts to solve simple ubject matter covered. Is is limited. Demonstrate ered. Fail to understand skills.  No. of Hours 36	

	Assignments		30	CLO 1,2,3,4	
	Examination		70	CLO 1,2,3,4	
reading and	Hotchkiss J.H. & Porter N.N. Food Fenema O.R. Food Chemistry. Ma	rcel Dekker, 1996			
online materials	Brown A. Understanding Food : Principles and Preparation. Wadsworth, Cengage Learning, 2011 Whitney E. & Rolfes S.R. Understanding Nutrition. Wadsworth, Cengage Learning, 2011				
Course Website	http://moodle.hku.hk/				

	Evolution	nary diversity (6 cre	edits)	Academic Yea	ar 2017	
Offering Department	Biological	Sciences		Quota	250	
Course Co-ordinator	Prof R M	Prof R M K Saunders, Biological Sciences (saunders@hku.hk)				
Teachers Involved	(Dr C Yau,Biological Sciences) (Dr M Yasuhara,Biological Sciences) (Prof R M K Saunders,Biological Sciences) (Prof Y Sadovy,Biological Sciences)					
Course Objectives	To provide students with an introduction to the diversity of plant and animal life. Recent research has resulted in fundamental changes in our understanding of evolutionary history (phylogeny). Current evolutionary trees will be used as the basis for a survey of different groups in phylogenetic sequence, and for understanding how structures processes and behaviours have changed through time.					
Course Contents & Topics	(Rhodoph seedless Ginkgoph Mollusca, (Batracho	Introduction to the methodology for reconstructing the sequence of past evolutionary events (cladistics); algae (Rhodophyta, Phaeophyta and Chlorophyta); non-vascular plants (Hepatophyta, Anthocerophyta and Bryophyta); seedless vascular plants (Lycophyta, Psilophyta, Sphenophyta and Pterophyta); seed plants (Cycadophyta, Ginkgophyta, Coniferophyta, Gnetophyta and Anthophyta); invertebrates (Cnidaria, Platyhelminthes, Annelida, Mollusca, Nematoda, Arthropoda and Echinodermata); fish (Chondrichthyes and Actinopterygii); amphibians (Batrachomorpha); reptiles (Anapsida, Lepidosauromorpha and Archosauromorpha); and mammals (Monotremata, Matatheria and Eutheria)				
Course Learning Outcomes	On succes CLO 1 in ev CLO 2 de	Metatheria and Eutheria).  On successful completion of this course, students should be able to:  CLO 1 interpret phylogenies in order to understand the relatedness of taxonomic groups and the pattern or evolutionary changes in structures, processes and behaviours  CLO 2 describe the characteristics of different evolutionary lineages of plants and animals and recall the names of the main taxonomic groups  CLO 3 explain the possible selective advantages of the highlighted structures, processes and behaviours				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL		ŭ ŭ	<u> </u>		
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	019 : Y	Examination	May	
Grade Descriptors (A+ to F)	Α		nsive knowledge required for attaining mo Show evidence of significant critical abilition			
		B Demonstrate substantial command of knowledge required for attaining most of the course learning outcomes, with some use of named examples. Show evidence of critical abilities and logical thinking. Apply effective presentation skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning				
		named examples. Show evice Demonstrate general but in	nmand of knowledge required for dence of critical abilities and logica acomplete command of knowledge	I thinking. Apply effective presentation skills ge and skills required for attaining most	omes, with some use of s. of the course learning	
		named examples. Show evic Demonstrate general but ir outcomes, with only limited moderately effective present Demonstrate partial but limit	mmand of knowledge required for dence of critical abilities and logica accomplete command of knowledg I use of named examples. Show ation skills. ted command of knowledge and s	I thinking. Apply effective presentation skills the and skills required for attaining most to evidence of some critical abilities and kills required for attaining some of the countries.	omes, with some use of s. of the course learning logical thinking. Apply urse learning outcomes.	
	С	named examples. Show evic Demonstrate general but ir outcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills. Demonstrate little or no evi without use of named exan	mmand of knowledge required for tlence of critical abilities and logica complete command of knowledg I use of named examples. Show ation skills. ted command of knowledge and s d examples. Show evidence of lim dence of command of knowledge apples. Show little or no evidence	I thinking. Apply effective presentation skills ge and skills required for attaining most v evidence of some critical abilities and	omes, with some use of s. of the course learning logical thinking. Apply urse learning outcomes, oply limited presentation rise learning outcomes, rise learning outcomes,	
Course Type	C D Fail	named examples. Show evic Demonstrate general but ir outcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills. Demonstrate little or no evi without use of named exam minimally effective or ineffec	mmand of knowledge required for lence of critical abilities and logica complete command of knowledg I use of named examples. Show ation skills. led command of knowledge and s de examples. Show evidence of lim dence of command of knowledge apples. Show little or no evidence tive.	I thinking. Apply effective presentation skills the and skills required for attaining most of evidence of some critical abilities and kills required for attaining some of the cou- nited critical abilities and logical thinking. Apply and skills required for attaining the countries the sand skills required for attaining the countries.	omes, with some use of s. of the course learning logical thinking. Apply urse learning outcomes, oply limited presentation rise learning outcomes, rise learning outcomes,	
	D Fail	named examples. Show evic Demonstrate general but in outcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills. Demonstrate little or no evi without use of named exam minimally effective or ineffec ith laboratory component	mmand of knowledge required for lence of critical abilities and logica complete command of knowledg I use of named examples. Show ation skills. led command of knowledge and s de examples. Show evidence of lim dence of command of knowledge ples. Show little or no evidence tive. t course	I thinking. Apply effective presentation skills the and skills required for attaining most of evidence of some critical abilities and kills required for attaining some of the cou- nited critical abilities and logical thinking. Apply and skills required for attaining the countries the sand skills required for attaining the countries.	omes, with some use of second control of the course learning logical thinking. Apply urse learning outcomes only limited presentation rese learning outcomes, resentational skills are	
Course Teaching	D Fail Lecture w	named examples. Show evic Demonstrate general but in outcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills. Demonstrate little or no evi without use of named exam minimally effective or ineffec ith laboratory component	mmand of knowledge required for lence of critical abilities and logica complete command of knowledg I use of named examples. Show ation skills. led command of knowledge and s de examples. Show evidence of lim dence of command of knowledge apples. Show little or no evidence tive.	I thinking. Apply effective presentation skills the and skills required for attaining most of evidence of some critical abilities and kills required for attaining some of the cou- nited critical abilities and logical thinking. Apply and skills required for attaining the countries the sand skills required for attaining the countries.	omes, with some use of seconds.  of the course learning logical thinking. Apply urse learning outcomes, ply limited presentation rese learning outcomes, resentational skills are	
Course Teaching	C D Fail Lecture w Activities Lectures	named examples. Show evic Demonstrate general but in outcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills. Demonstrate little or no evi without use of named exa minimally effective or ineffec ith laboratory componen	mmand of knowledge required for lence of critical abilities and logica complete command of knowledg I use of named examples. Show ation skills. led command of knowledge and s de examples. Show evidence of lim dence of command of knowledge ples. Show little or no evidence tive. t course	I thinking. Apply effective presentation skills the and skills required for attaining most of evidence of some critical abilities and kills required for attaining some of the cou- nited critical abilities and logical thinking. Apply and skills required for attaining the countries the sand skills required for attaining the countries.	omes, with some use of s. of the course learning logical thinking. Apply urse learning outcomes, pply limited presentation rese learning outcomes, resentational skills are	
Course Teaching	C D Fail Lecture w Activities Lectures Laborator	named examples. Show evic Demonstrate general but in outcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills. Demonstrate little or no evi without use of named exa minimally effective or ineffec- ith laboratory component	mmand of knowledge required for lence of critical abilities and logica complete command of knowledg I use of named examples. Show ation skills. led command of knowledge and s de examples. Show evidence of lim dence of command of knowledge ples. Show little or no evidence tive. t course	I thinking. Apply effective presentation skills the and skills required for attaining most of evidence of some critical abilities and kills required for attaining some of the cou- nited critical abilities and logical thinking. Apply and skills required for attaining the countries the sand skills required for attaining the countries.	omes, with some use of s. of the course learning logical thinking. Apply urse learning outcomes, ply limited presentation rese learning outcomes, resentational skills are	
Course Teaching & Learning Activities  Assessment Methods	C D Fail Lecture w Activities Lectures Laborator	named examples. Show evic Demonstrate general but in outcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills.  Demonstrate little or no evi without use of named examinimally effective or ineffectith laboratory components.	mmand of knowledge required for lence of critical abilities and logica complete command of knowledg I use of named examples. Show ation skills. led command of knowledge and s de examples. Show evidence of lim dence of command of knowledge ples. Show little or no evidence tive. t course	I thinking. Apply effective presentation skills the and skills required for attaining most of evidence of some critical abilities and kills required for attaining some of the cou- nited critical abilities and logical thinking. Apply and skills required for attaining the countries the sand skills required for attaining the countries.	omes, with some use of s. of the course learning logical thinking. Apply urse learning outcomes only limited presentation rese learning outcomes, by limited presentation as kills are  No. of Hours 24 36 100  Assessment Methods	
Course Teaching & Learning Activities  Assessment Methods	C D Fail Lecture w Activities Lectures Laborator Reading	named examples. Show evic Demonstrate general but in outcomes, with only but in outcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills. Demonstrate little or no evi without use of named exan minimally effective or ineffec ith laboratory components s	mmand of knowledge required for lence of critical abilities and logica ncomplete command of knowledge i use of named examples. Show ation skills. ted command of knowledge and s de examples. Show evidence of lim dence of command of knowledge piles. Show little or no evidence tive. t course Details	I thinking. Apply effective presentation skills the and skills required for attaining most of veridence of some critical abilities and skills required for attaining some of the countried critical abilities and logical thinking. Apply and skills required for attaining the countried critical abilities and logical thinking. Potential abilities and logical thinking. Potential abilities and logical thinking.	omes, with some use of s. of the course learning logical thinking. Apply urse learning outcomes only limited presentation rese learning outcomes, or esentational skills are  No. of Hours 24 36 100 Assessment Methods to CLO Mapping	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	C D Fail Lecture w Activities Lectures Laborator Reading Methods Examinat	named examples. Show evic Demonstrate general but ir outcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills. Demonstrate little or no evi without use of named exan minimally effective or ineffec ith laboratory components s	mmand of knowledge required for lence of critical abilities and logica ncomplete command of knowledge i use of named examples. Show ation skills. ted command of knowledge and s de examples. Show evidence of lim dence of command of knowledge piles. Show little or no evidence tive. t course Details	I thinking. Apply effective presentation skills le and skills required for attaining most v evidence of some critical abilities and skills required for attaining some of the coulited critical abilities and logical thinking. Apply and skills required for attaining the coul of critical abilities and logical thinking. Power of critical abilities and logical thinking.	omes, with some use of s. of the course learning logical thinking. Apply urse learning outcomes only limited presentation rese learning outcomes, by limited presentation as kills are  No. of Hours 24 36 100  Assessment Methods	
Course Teaching & Learning Activities Assessment Methods and Weighting	C D Fail Lecture w Activities Lectures Laborator Reading / Methods Examinat Laborator P. H. Rav	named examples. Show evic Demonstrate general but invitoutcomes, with only limited moderately effective present Demonstrate partial but limit with insufficient use of name skills. Demonstrate little or no evi without use of named exam minimally effective or ineffectith laboratory component s  Y Self study  ion y reports en, R. F. Evert & S. E. E.	mmand of knowledge required for lence of critical abilities and logica complete command of knowledge use of named examples. Show ation skills. ted command of knowledge and s de examples. Show evidence of lim dence of command of knowledge and s dexamples. Show evidence of lim dence of command of knowledge aples. Show little or no evidence tive.  t course  Details  Details	I thinking. Apply effective presentation skills te and skills required for attaining most v evidence of some critical abilities and kills required for attaining some of the coulited critical abilities and logical thinking. Apply and skills required for attaining the coulof critical abilities and logical thinking. Provided thinking and logical thinking. Provided thinking are designed to the coulof critical abilities and logical thinking. Provided thinking are grade (%)  Weighting in final course grade (%)  70  30  Freeman & Worth, New York, 2005	omes, with some use of s. of the course learning logical thinking. Apply urse learning outcomes only limited presentation received the second stress of the second state of the second sta	

BIOL1501	Bioethics (6 credits)	Academic Year	2017	
Offering Department	Biological Sciences		Quota	40
Course Co-ordinator	, Biological Sciences ()			
Teachers Involved	(,Biological Sciences)			
Course Objectives	The aim is to explore the ethical implications of the latest major advance	es in biolo	ogy and medicine	•
Course Contents & Topics	The course will discuss research ethic between student and mento advancements in biological and medical sciences. Major areas to be genetics, reproduction, disease diagnosis and therapy, development, and the use of animals in research. Ethical and moral principles and i policy raised by these advances will be discussed.	e discuss transplan	ed include but a ntation, aging, dyi	re not limited to: ng, environment,
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 familiarize with the current ethical theories, discussions, an bioethics specifically related to the advancement of modern mo CLO 2 reflect upon and formulate in a professional manner their ow understand and enter into a respectful dialogue with those who	olecular bio n opinion	ology and genomi s on these matte	cs ers as well as to

		nderstand the basis of one's own			
	CLO 4 deal with the quandaries that arise when facing modern medical technology and advancements				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL				
Offer in 2017 - 2018	N Of	N Offer in 2018 - 2019 : N <b>Examination</b>			
Grade Descriptors (A+ to F)	Α	Demonstrate thorough grasp of the su evidence of creative ability and con techniques and analysis of data and in highly effective individual as well as co	npetence in professional-level proble results to draw appropriate and insighable bllaborative-based organizational and	em solving. Critically use corntful conclusions to real-world presentational skills.	mmunication skills and problems. Demonstrate
	В	Demonstrate substantial grasp of the thinking with some evidence of companalysis of data and results to draw gas well as collaborative-based organize	etence in professional-level problem s generally appropriate conclusions to	solving. Use communication sk	kills and techniques and
	С	Demonstrate general but incomplete ( and logical thinking with limited compound analysis of data and results to drawn Demonstrate moderately individual as	etence in professional-level problem sometive moderately appropriate but sometive	solving. Use communication si mes erroneous conclusions t	kills and techniques and o real-world problems.
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate individual as well as collaborative-based organizational and presentational skills of limited effectiveness.				
	Fail	Demonstrate little or no grasp, with re and logical thinking, and minimal con and analysis of data and results ineffe problems. Demonstrate ineffectivenes	npetence in professional-level proble ectively, leading generally to inapprop	m solving. Use communication oriate and usually erroneous controls.	n skills and techniques onclusions to real-world
Course Type	Lecture-b	pased course			
Course Teaching	Activitie	es Details	5		No. of Hours
& Learning Activities	Lectures				
	Tutorials				12
	Assessn	nent			100
Assessment Methods and Weighting	Methods	S Details	S	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm		uous assessment of essays, tation and debate exercises	60	CLO 1,2,3,4
	Examina	ition		40	CLO 1,2,3,4
Required/recommended reading and online materials					
Additional Course Information	This coul	rse will be offered subject to a min	nimum enrollment number and	l availability of teachers.	

BIOL1502	The gene	(6 credits)			Academic Year	2017
Offering Department	Biological S	Sciences			Quota	50
Course Co-ordinator	, Biologic	al Sciences ()				
Teachers Involved	(,Biologic	cal Sciences)				
Course Objectives	genome ar well as lots is to open	ive is to expose studer d many agricultural crop of technical and ethical up students from all ba entific and social disciplii	os and animals genom issues/challenges that ackgrounds to this bas	es, it brings not only pro general public need to	omises of a bette deal with. The g	r quality of life a oal of this cours
Course Contents & Topics	Introduction Basic gene Basic Mole Bacterial G Human Ge Human Ge Genes and Genes and Animal and Genes and		chnology - Recombinar inment istory and its Impacts! scovery!	nt DNA and cloning		
Course Learning	On succes	sful completion of this co	ourse, students should	be able to:		
Outcomes	CLO 1 de	monstrate understanding	g and to explain the pri	nciple of inheritance, re	combinant DNA	and cloning
	CLO 2 ga	n deep understanding a	bout the advancement	of biotechnology		
	CLO 3 de	termine and explain the	benefits and shortcomi	ngs of the application o	f biotechnology k	nowledge
Pre-requisites (and Co-requisites and Impermissible combinations)	equivalent.	dents with level 3 or a	above in HKDSE Bio			y component o
Offer in 2017 - 2018	N Offe	r in 2018 - 2019 : N			Examination	
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp evidence of creative ability techniques and analysis of da highly effective individual as v	and competence in profess ata and results to draw appr well as collaborative-based of	sional-level problem solving. opriate and insightful conclus rganizational and presentatio	Critically use commisions to real-world pro nal skills.	nunication skills and oblems. Demonstrate
	В	Demonstrate substantial grathinking with some evidence analysis of data and results that as well as collaborative-based	of competence in profession to draw generally appropriat d organizational and present	al-level problem solving. Use e conclusions to real-world p ational skills.	communication skills roblems. Demonstrat	s and techniques and te effective individual
	С	Demonstrate general but inco and logical thinking with limite				

		analysis of data and results to draw moderately appropriate but sometimes erroneous of Demonstrate moderately individual as well as collaborative-based organizational and present				
	evidend skills a	ce of coherent and land techniques and a problems. Demonstr	ited grasp, with retention of s logical thinking, but lacking contained analysis of data and results to attain at a contained as well as well as contained as well a	ompetence in pro draw sometimes	fessional-level problem so appropriate but often erro	lving. Use communication neous conclusions to real-
	and log and an probler	gical thinking, and malysis of data and rens. Demonstrate inef	sp, with retention of little relevinimal competence in profess sults ineffectively, leading genfectiveness individual as well a	ional-level problemerally to inapprop	n solving. Use communica riate and usually erroneous	ation skills and techniques s conclusions to real-world
Course Type	Lecture-based co	urse				
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Reading / Self study		including 45 hours on 15 essay/report writing, 30 presentation (include preparation)			93
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		discussion forum		35	CLO 1,2,3
	Essay		essays & written repor	ts	25	CLO 1,2,3
	Presentation		poster & oral presentat	tion	30	CLO 1,2,3
	Test		in-class participation &	quizzes	10	CLO 1,2,3
Required/recommended reading and online materials	Library & web-ba	sed reading mate	erials			
Additional Course Information	This course will b	e offered subjec	t to a minimum enrollme	nt number and	availability of teacher	S.

DIOL 2404	Dulm alm !		otm. (C one dita)	Academia Vas	2017	
BIOL2101		es of food chemi	stry (6 credits)	Academic Yea		
Offering Department	Biological Sciences Quota 30					
Course Co-ordinator			ces (jettylee@hku.hk)			
Teachers Involved		Lee, School of Biolog				
Course Objectives	(Dr K W Cheng, School of Biological Sciences)					
Course Objectives	To provide a basic understanding of chemistry in food systems, and to provide practical training in chemistry related to food science and nutrition.					
Course Contents	The course will cover the components of food, including water, proteins, carbohydrates and lipids, and m				lipids, and mino	
& Topics	components such as enzymes, vitamins, minerals, colorants flavorants and additives. The physical and					
•	properties	of these important	constituents of foods are covered	d in detail, and form the basis for	understanding th	
	reactions	which occur during t	the production, processing, stora	ge and handling of foods, and ir	understanding the	
		used in analyzing foo				
Course Learning			nis course, students should be ab			
Outcomes			ns and properties of major and m			
			chemistry behind food processing			
			chemical and biochemical reaction			
		ave integrated their ontext	knowledge of biological and che	emical principles into a food sci	ence and nutrition	
Pre-requisites			or students who have passed in E	BIOI 3201		
(and Co-requisites			s admitted in 2017-2018 or therea			
and Impermissible		,				
combinations)						
Offer in 2017 - 2018	Y 1st	sem Offer in 2018	- 2019 : Y	Examination	Dec	
Grade Descriptors	Α		grasp of the subject matter covered. Sho			
(A+ to F)	and can readily apply this knowledge. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions.					
	B Demonstrate substantial grasp of the subject matter covered. Show thorough knowledge and understanding of the content and a					
	high level of competence in the topics covered and able to apply this knowledge and skills to most situations. Use lab skills an					
	С	techniques and analysis of data and results to draw generally appropriate conclusions.  C. Demonstrate general but incomplete grasp of the subject matter covered. The student has a sound knowledge and				
			nain areas of content and has achieved a			
			nd analysis of data and results to draw mo		·	
	D		t limited grasp, with retention of some re anding of the content and has achieved a			
			alysis of data and results to draw appropri		covered. Ose lab skill	
	Fail		o grasp, with retention of little relevant			
			tanding in few areas of the content and and techniques and analysis of data a			
		usually erroneous conc		ind results inchedively, leading general	ly to mappropriate and	
Course Type	Lecture wi	ith laboratory compo	nent course			
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laborator	•			36	
	Reading /	Self study			100	
Assessment Methods	Methods		Details	Weighting in final	Assessment	
and Weighting				course grade (%)	Methods	
					to CLO Mapping	
	Assignme		Laboratory reports	30	CLO 1,2,3,4	
	Examinat	ion		50	CLO 1,2,3,4	
	Test			20	CLO 1,2,3,4	
Required/recommended			y (Marcel Dekker 4th Ed, 2008)	4#- E-I 2000)		
reading and	Belitz HD,	Grosch W, Schiebe	rle, P, Food Chemistry (Springer	4tn Ea, 2009)		
online materials						
Course Website	THITD://MOO	dle.hku.hk				

Additional	Course
Information	n

The course will be offered subject to a minimum enrollment number and availability of teachers

BIOL2102	Biostatistics (6 credits)			Academic Yea	r 2017	
Offering Department	Biological	Sciences		Quota	190	
Course Co-ordinator	Prof K M \	Y Leung, Biological Scient	ences (kmyleung@hku.hk)			
Teachers Involved	(Prof K M	Y Leung, Biological Scient	ences)			
Course Objectives	The purpose of this course is to familiarise students with probability and statistics. The course will give to students the skills to read, interpret, and critically evaluate the statistics used in medical and bioinformatic studies. The course will also introduce the students to the fundamental principles and planning techniques to be able to analyze their own data, choose the correct statistical test and avoid common statistical pitfalls.					
Course Contents & Topics	Introduction to Statistics; Describing, Exploring and Comparing Data; Probability; Probability Distributions; Normal Probability Distribution; Relations between Distributions; Interval estimation; Hypothesis Testing; Correlation and Regression; Statistical tests; Non-Parametric Inference.					
Course Learning	On succes	ssful completion of this	course, students should be able	to:		
Outcomes	CLO 1	·				
	CLO 2	design experiments e	effectively			
	CLO 3	appreciate and interp	ret statistics in scientific papers			
	CLO 4	use Excel and R to ca	arry out common statistical com	putations		
	CLO 5		nptions of commonly used statis	•		
	CLO 6	critically evaluate the				
	CLO 7	evaluate critically the				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC1600 or BIOL1110 or BIOL2306 or ENVS1301 or ENVS2002					
Offer in 2017 - 2018	Y 2nd	d sem Offer in 2018 - 2	2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly effective computational skills and techniques for basic statistical analyses. Be able to critically use data and statistical results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.					
	B Demonstrate substantial grasp of the subject and skills required for attaining at least most of the course learning outcomes. Present evidence of analytical and critical abilities and logical thinking. Apply effective computational skills and techniques for basic statistical analyses. Be able to correctly use data and statistical results to draw appropriate conclusions. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete grasp of the subject and skills required for attaining some of the course learning outcomes. Present evidence of some analytical and critical abilities and logical thinking. Apply moderately effective computational skills and techniques for basic statistical analyses. Demonstrate mostly correct but some erroneous use of data and statistical results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D					
	Fail	Present evidence of little of ineffective computational s	or lack of analytical and critical abilitie kills and techniques for basic statistical	Is required for attaining any of the courts, logical and coherent thinking. Apply I analyses. Demonstrate misuse of data fective or ineffective organizational and	minimally effective or a and statistical results	
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
_	Tutorials		including projects		24	
		/ Self study	inolading projects		100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		50	CLO 1,2,3,4,5,6,7	
reading and			Examination 50 CLO 1,2,3,4,5,6,7 The Practice of Statistics in the Life Sciences by Baldi and Moore and Fundamentals of Biostatistics by Rosner.			
online materials						
Course Website	http://moo	odle.hku.hk/				

BIOL2103	Biological sciences laboratory course (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	220
Course Co-ordinator	Dr W Y Lui, Biological Sciences (wylui@hku.hk)		
Teachers Involved	(Dr A Yan,Biological Sciences) (Dr W Y Lui,Biological Sciences) (Prof B K C Chow,Biological Sciences)		
Course Objectives	The objective is to provide students a comprehensive training in basic lab biological studies. The course will cover a number of techniques used by mo to conduct scientific research.		
Course Contents & Topics	This course will be divided into three modules and each module will have 3 lat Module one: Nucleic acid analysis DNA & RNA isolation, spectrometry, gel electrophoresis, restriction enzyme ar Module two: Protein analysis Centrifugation, chromatography and SDS-PAGE electrophoresis.  Module three: Microbiology Microscopy, observation of microorganisms and staining of bacteria, isolatic serial dilution, enumeration of microbial cells by Petroff-Hausser counting cha	nalysis and DNA sec	by streaking and

	classifica	classification of microbes from natural source and statistical analysis.					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 demonstrate knowledge in proper use of simple research equipment						
		lemonstrate knowledge a setting	and understanding of how and	why certain techniques are	used in a research		
	CLO 3 n	naster some basic laborat	tory techniques for carrying out	experiments			
	CLO 4 u	inderstand the different w	ays that microorganisms were o	categorized according to their	r size, shape, colour		
	а	and response to dye etc. and how they were counted					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	Pass in BIOL1110					
Offer in 2017 - 2018	Y 1s	t sem 2nd sem Offer	in 2018 - 2019 : Y	Examination	Dec May		
Grade Descriptors (A+ to F)	A	outcomes. Show strong an effective lab skills and techn effective organizational and		al thinking, with evidence of origin- to draw appropriate and insightful of	al thought. Apply highly conclusions. Apply highly		
	В	B Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D	·					
	Fail  Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Laborato	ry and workshop course					
Course Teaching	Activitie	es .	Details		No. of Hours		
& Learning Activities	Laborato	ory	11 laboratory sessions (4 hours each)		44		
	Tutorials	3	lecture/tutorials		18		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Laborato	ory reports	plus lab performance	60	CLO 1,2,3,4		
	Test		1 hour final examination	40	CLO 1,2		
Course Website	http://mo	odle.hku.hk/					
Additional Course	-,	) - 1st Semester					
Information	Quota 14	10 - 2nd Semester	nd Lab. B on Thurs.with 40 stud .ab. D on Thurs. with 65 student				

BIOL2220	Principle	Principles of biochemistry (6 credits)  Academic Year 2017					
Offering Department	Biological	Sciences	•	Quota	100		
Course Co-ordinator	Dr C S C	Lo, Biological Sciences	(clivelo@hku.hk)				
Teachers Involved	(Dr C S C	(Dr C S C Lo,Biological Sciences)					
Course Objectives		This course is designed to provide undergraduate (non-biochemistry major) an overview of fundamental concepts in biochemistry as well as hands-on experience in biochemical techniques.					
Course Contents & Topics	emphasis	An introduction to various biomolecules in terms of their structures, functions, syntheses and metabolisms, with emphasis on amino acids, proteins, enzymes, carbohydrates, lipids and nucleic acids. The correlations between their biochemical properties and their roles in various life processes will be illustrated.					
Course Learning	On succe	ssful completion of this of	ourse, students should be able to:				
Outcomes	CLO 1 de	escribe the key structura	features of carbohydrates, proteins, lip	pids and nucleotides			
	CLO 2 ur	nderstand the basic enzy	me kinetic properties				
		cplain how the common	sugars, fatty acids and amino acids a	are metabolized and syn	thesized in living		
Pre-requisites	Pass in BIOL1110; and Not for students who have passed in BIOC2600, or have already enrolled in this course.						
and Impermissible	NOT IOT SIL	duents who have passed	in BIOC2600, or nave already enrolled	o in this course.			
and Impermissible combinations)		sem Offer in 2018 - 20	<u>,</u>	Examination	Dec		
and Impermissible combinations) Offer in 2017 - 2018		sem Offer in 2018 - 20 Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wi	019 : Y tery at an advanced level of extensive knowle rong analytical and critical abilities and logical ti de range of complex, familiar and unfamiliar si	Examination  edge and skills required for atthinking, with evidence of origin	taining all the course all thought, and ability		
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Y 1st	sem Offer in 2018 - 20 Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a witheories, principles, evidenc. Demonstrate substantial co learning outcomes. Show evi	019 : Y tery at an advanced level of extensive knowle rong analytical and critical abilities and logical ti de range of complex, familiar and unfamiliar si	Examination  Exami	taining all the course tal thought, and ability range of appropriate st most of the course		
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st	sem Offer in 2018 - 20 Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a witheories, principles, evidenc Demonstrate substantial co learning outcomes. Show evand some unfamiliar situatio Demonstrate general but in outcomes. Show evidence evidence show evidence evidence in 2018 of 201	on the proof of th	Examination  adge and skills required for at  binking, with evidence of origin  tuations. Integration of the full  Ils required for attaining at lea  cal thinking, and ability to apply  idence and techniques  required for attaining most of  cal thinking, and ability to app	taining all the course all thought, and ability range of appropriate st most of the course knowledge to familiar f the course learning		
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st	sem Offer in 2018 - 20 Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a witheories, principles, evidence. Demonstrate substantial co learning outcomes. Show evand some unfamiliar situation Demonstrate general but in outcomes. Show evidence familiar situations. Some pa Demonstrate partial but limi Show evidence of some cof	tery at an advanced level of extensive knowler rong analytical and critical abilities and logical tide range of complex, familiar and unfamiliar sie and techniques mmand of a broad range of knowledge and skildence of analytical and critical abilities and logins. General integration of theories, principles, evincomplete command of knowledge and skills of some analytical and critical abilities and loging the command of knowledge and skills.	Examination  adge and skills required for at thinking, with evidence of origin tuations. Integration of the full lls required for attaining at lea cal thinking, and ability to apply idence and techniques required for attaining most of cal thinking, and ability to app and techniques for attaining some of the cours tical and critical abilities. Show	taining all the course all thought, and ability range of appropriate st most of the course knowledge to familiar f the course learning ly knowledge to most se learning outcomes.		
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st A B	Sem Offer in 2018 - 20 Demonstrate thorough mas learning outcomes. Show sit to apply knowledge to a witheories, principles, evidenc Demonstrate substantial co learning outcomes. Show evand some unfamiliar situation Demonstrate general but in outcomes. Show evidence familiar situations. Some particular situations. Some particular situations of some colknowledge to solve problem Demonstrate little or no evic of analytical and critical at	tery at an advanced level of extensive knowler orang analytical and critical abilities and logical tide range of complex, familiar and unfamiliar sie and techniques mmand of a broad range of knowledge and skiidence of analytical and critical abilities and logic ns. General integration of theories, principles, expromplete command of knowledge and skills of some analytical and critical abilities and logical tilal integration of theories, principles, evidence at ted command of knowledge and skills required	Examination  Independent of the state of the	taining all the course taining all the course tall thought, and ability range of appropriate st most of the course t knowledge to familiar f the course learning ly knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack		
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	Laboratory	3 laboratory sessions		24
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examination		60	CLO 1,2,3
	Laboratory reports		10	CLO 1,2,3
	Test		30	CLO 1,2,3
Required/recommended reading and online materials	L.A. Moran, H.R. Horton, K.G. International Edition)	Scrimgeour, M.D. Perry: Princip	les of Biochemistry 5th	edition (Pearson
Course Website	http://moodle.hku.hk/			

BIOL2306	Ecology and evolution (6 credits)  Academic Yea				ar 2017	
Offering Department	Biological	•	-,	Quota	89	
Course Co-ordinator			nces (ddudgeon@hku.hk)	1 24	1	
Teachers Involved		udgeon,Biological Scier				
			component only),Biological Sciences	<i>'</i>		
Course Objectives	The interaction between organisms and their environment is addressed using an issue-based approach in order to					
	explains how the ecology of plants and animals has been shaped by evolution through interactions with their living and non-living environment. The course also demonstrates how we can understand and explain the significance of					
		•	entific methods. A field course comp	•	•	
		•	community composition, biodiversity		, ,	
Course Contents			nisms profoundly. It affects their pre			
& Topics	and adapt	tations. Present day hu	) and, through natural selection actir uman-induced changes to the environment	onment are also responsi	ible for endangering	
	ecology a	and evolution, showing	ibitats. This introductory course in g how they are linked to the en in turn, lead to specialization and	vironment by physiologic	cal tolerances and	
	interaction	ns will be a major foci	us of the course together with dis	cussion of population dy	namics, community	
	with the e	nvironment will also be	e demonstrated by describing the or primates, and the main ecological	rigins of modern humans,	, including our fossi	
	environme		se will conclude with an account of			
	Lectures a variety of	are complemented by a Hong Kong habitats to	a 5-day residential field course duri o study their biodiversity, communi	o o		
		and their environment				
Course Learning Outcomes	CLO 1 un	nderstand how scientif	course, students should be able to: ic methods (hypotheses, experime	ents, comparisons) are u	ised to investigate	
	CLO 2 un		chanism of natural selection, and h	ow interactions with the e	environment lead to	
	adaptation and generate biodiversity  CLO 3 understand that ecology and behaviour can be interpreted in the light of selective pressures from the					
		nvironment upon individ	-	the human evolutionary tr	roo as an ovamplo	
	CLO 4 understand the ecological factors influencing evolution, using the human evolutionary tree as an example CLO 5 understand the community ecology and biodiversity of selected Hong Kong habitats, and typical					
	adaptations of organisms found there					
	Pass in BIOL1110 or BIOL1309 or ENVS1301 or ENVS1401					
	Pass in BI					
(and Co-requisites	Pass in BI					
(and Co-requisites and Impermissible	Pass in BI					
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018		OL1110 or BIOL1309 o	or ENVS1301 or ENVS1401	Examination	Dec	
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)		sem Offer in 2018 - 2  Evidence of complete or ne learning outcomes, and evorganizational, presentation	or ENVS1301 or ENVS1401  2019 : Y ear-complete understanding and a thorough of the complete understanding and a thorough of the complete understanding and fieldwork technal and/or analytical skills and fieldwork tech	grasp of the subject as demonstr s, including local species and h	rated by attainment of al nabitats. Show excellent	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st	sem Offer in 2018 - 2  Evidence of complete or ne learning outcomes, and evorganizational, presentation what is required at degree    Evidence of substantial uncoutcomes, and use of new process.	or ENVS1301 or ENVS1401  2019: Y ear-complete understanding and a thorough of the sear complete understanding and a thorough of the sear complete understanding and a good grasp of the subject of the su	grasp of the subject as demonstrations, including local species and hindues. Excellent or outstanding as demonstrated by attainment of all species and habitats. Show	rated by attainment of al nabitats. Show excellent (for A+) work relative to of the majority of learning w good organizational,	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st	sem Offer in 2018 - 2  Evidence of complete or ne learning outcomes, and exorganizational, presentation what is required at degree le Evidence of substantial uncoutcomes, and use of ne presentational and/or analy Evidence of general under incomplete attainment of	or ENVS1301 or ENVS1401  2019: Y ear-complete understanding and a thorough of the standard (organism) examples and and/or analytical skills and fieldwork tech level.  derstanding and a good grasp of the subject of the standard (organism) examples, including loc critical skills and fieldwork techniques. Work more standing with an adequate (but incomplete) most of the learning outcomes, with lim	grasp of the subject as demonstrations, including local species and hinques. Excellent or outstanding as demonstrated by attainment of all species and habitats. Showere than sufficient for what is required to grasp of the subject, as demontant of the subject of the subject.	rated by attainment of al nabitats. Show excellent ((for A+) work relative to of the majority of learning w good organizational, uired at degree level. onstrated by general but of examples. Show fair	
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(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 1st A B C D Fail Lecture wi	sem Offer in 2018 - 2  Evidence of complete or ne learning outcomes, and exorganizational, presentation what is required at degree levidence of substantial uncoutcomes, and use of ne presentational and/or analy Evidence of general under incomplete attainment of organizational, analytical, presentational and/or analytical programizational, analytical, programizational, analytical, programizational, analytical programizational, analytical programizational, analytical programizational programizati	or ENVS1301 or ENVS1401  2019: Y ear-complete understanding and a thorough of the standard process of named (organism) examples and and/or analytical skills and fieldwork tech level.  deerstanding and a good grasp of the subject of the standard (organism) examples, including locatical skills and fieldwork techniques. Work more standing with an adequate (but incomplete, most of the learning outcomes, with limpresentational and/or analytical skills and field minimum of relevant information and incompated by partial but limited attainment of leanisms. Work merely (for D+) or barely (D) acquate knowledge and understanding of the suddence of familiarity with fieldwork techniques, int course  Details  24 hours lectures, plus 10 hoursidents.	grasp of the subject as demonstis, including local species and hiniques. Excellent or outstanding as demonstrated by attainment of all species and habitats. Shower than sufficient for what is required use of named (organism) thours techniques. Work sufficient for what is required and the control of the subject arming outcomes. Insufficient feequate for what is required at delipiect such that the majority of less that the majority	rated by attainment of al nabitats. Show excellent (for A+) work relative to of the majority of learning w good organizational, uired at degree level. Instrated by general but (examples. Show fair the for what is required for the ct (i.e. knowledge is very familiarity with fieldwork egree level.	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 1st A B C D Fail Lecture wi Activities	Sem Offer in 2018 - 2  Evidence of complete or ne learning outcomes, and evioranizational, presentation what is required at degree    Evidence of substantial undoutcomes, and use of night presentational and/or analytical programizational, analytical, programizational, and programizational pro	or ENVS1301 or ENVS1401  2019: Y ear-complete understanding and a thorough of the sear complete understanding and a thorough of the sear complete understanding and a thorough of the sear complete understanding and a good grasp of the subject of the sear complete understanding and a good grasp of the subject of the sear complete the subject of the sear complete the sear complete the sear complete the search of the learning outcomes, with limporesentational and/or analytical skills and field minimum of relevant information and incompleted by partial but limited attainment of leanisms. Work merely (for D+) or barely (D) acquate knowledge and understanding of the sudence of familiarity with fieldwork techniques, and course  Details  24 hours lectures, plus 10 hor residential field course at least 36 hours field and laborat individuals	grasp of the subject as demonstis, including local species and iniques. Excellent or outstanding as demonstrated by attainment of all species and habitats. Shower than sufficient for what is required use of named (organism) dwork techniques. Work sufficier forward in the subject of the subject and in the subject and in the subject such that the majority of less that the subject such that the majority of less than the majority of l	rated by attainment of al nabitats. Show excellent (for A+) work relative to of the majority of learning w good organizational, uired at degree level. Instrated by general but (i.e. knowledge is very familiarity with fieldwork egree level. earning outcomes cannots to reach degree level.  No. of Hours	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities	Y 1st A B C D Fail Lecture wi Activities Lectures Laborator	Sem Offer in 2018 - 2  Evidence of complete or ne learning outcomes, and evioranizational, presentation what is required at degree    Evidence of substantial undoutcomes, and use of night presentational and/or analytical programizational, analytical, programizational, and programizational pro	or ENVS1301 or ENVS1401  2019: Y ear-complete understanding and a thorough of excellent use of named (organism) examples nal and/or analytical skills and fieldwork tech level.  derstanding and a good grasp of the subject of a lamed (organism) examples, including locytical skills and fieldwork techniques. Work more standing with an adequate (but incomplete) most of the learning outcomes, with limporesentational and/or analytical skills and field minimum of relevant information and incompated by partial but limited attainment of leanisms. Work merely (for D+) or barely (D) acquate knowledge and understanding of the sudence of familiarity with fieldwork techniques, int course  Details  24 hours lectures, plus 10 hor residential field course at least 36 hours field and laborat	grasp of the subject as demonstis, including local species and hiniques. Excellent or outstanding as demonstrated by attainment of all species and habitats. Shower than sufficient for what is regionally a species and habitats. Shower than sufficient for what is regionally as the subject, as demonstrated use of named (organism) and work techniques. Work sufficient fewer than the subject such that the majority of less than the subject such that the majority of less than that the majority of less than the subject such that the majority of less than the majority of less than the majority of less than the majority of	rated by attainment of al nabitats. Show excellent (for A+) work relative to of the majority of learning w good organizational, uired at degree level. Instrated by general but examples. Show fair nt for what is required for ct (i.e. knowledge is very amiliarity with fieldwork egree level.  No. of Hours  34	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 1st A B C D Fail Lecture wi Activities Lectures Laborator	sem Offer in 2018 - 2  Evidence of complete or ne learning outcomes, and evioranizational, presentation what is required at degree    Evidence of substantial undoutcomes, and use of ne presentational and/or analy    Evidence of general under incomplete attainment of organizational, analytical, presentational events    Evidence of retention of a incomplete), as demonstratechniques, habitats or organizational, but in the complete in the complet	or ENVS1301 or ENVS1401  2019: Y ear-complete understanding and a thorough of the sear complete understanding and a thorough of the sear complete understanding and a thorough of the sear complete understanding and a good grasp of the subject of the sear complete understanding and a good grasp of the subject of the sear complete of the subject of the sear complete of the learning outcomes, with limplete most of the learning outcomes, with limplete most of the learning outcomes, with limplete outcomes of familiarity with fieldwork techniques, and course  Details  24 hours lectures, plus 10 hour residential field course at least 36 hours field and laborat individuals during the semester in the form	grasp of the subject as demonstis, including local species and hiniques. Excellent or outstanding as demonstrated by attainment of all species and habitats. Shower than sufficient for what is regionally a species and habitats. Shower than sufficient for what is regionally as the subject, as demonstrated use of named (organism) and work techniques. Work sufficient fewer than the subject such that the majority of less than the subject such that the majority of less than that the majority of less than the subject such that the majority of less than the majority of less than the majority of less than the majority of	rated by attainment of al nabitats. Show excellent (for A+) work relative to of the majority of learning w good organizational, uired at degree level. Instrated by general but (examples. Show fair the for what is required for the cit. (i.e. knowledge is very familiarity with fieldwork egree level.  No. of Hours  34  36	

	Examination		70	CLO 1,2,3,4
Required/recommended reading and online materials	Boyd, R. & Silk, J.B. (1997) How library.) Stilling, P. (2002) Ecology: Theorie An up-to-date list of references to relevant to each lecture will be pro	s and Applications (4th Edition). the primary scientific literature	Prentice Hall, Singapore.	
Course Website	http://www.biosch.hku.hk/ecology/	lsc/		
Additional Course Information	A compulsory 5-day residential fiel Details of the location and cost of will be made available at the start per head in 2016-2017 was \$900 (	the residential field course, which of the semester. Priority will be	h will be held in the Reading v	,

	Animal behaviour (6 credits)  Academic Yea				2017	
Offering Department	Biologica	l Sciences		Quota	30	
Course Co-ordinator	Dr L Kard	czmarski, Biological Scier	nces (leszek@hku.hk)			
Teachers Involved						
Course Objectives	This course teaches students the ways and means of exploring and understanding animal behaviour; it provides insights into a field of science that investigates everything animals do, including the underlying mechanisms and functions of specific behaviours; the ways in which animals interact with each other, with their physical environmen and other organisms; how animals find and defend resources, avoid predators, choose mates, reproduce, and care for their young; how complex animal societies are formed and how behaviour of an individual affects the structure of a population.					
Course Contents & Topics	This course will introduce students to scientific reasoning and conceptual basis of an understanding of animal behaviour and behavioural ecology. What causes specific behaviour and what are the underlying mechanisms? How does behaviour develop within the individual's lifetime and what functions does it serve? For example; why are some species monogamous while others are polygamous? What makes one organism the hunter and another the hunted? Several animal species, including humans, tend to live in groups; social life is among the most complex and effective survival strategy. However, how could, for instance, the birth of sterile castes, like in bees, be explained through an evolving mechanism which emphasizes the reproductive success of as many individuals as possible? Why, among animals living in small groups like squirrels, would an individual risk its own life to save the rest of the group? In this course, based upon ecological and evolutionary principles, students will learn to think within the paradigm of behavioural ecology and understand the causes, functions, development, and evolution of behaviour. We will discuss several classical studies that form the foundation of this field, as well as more recent research that represents the current concepts which have led to modern understanding of animal behaviour. We will also illustrate the links between the recent extraordinary advances in behavioural ecology and socio-ecology with their application in animal conservation.					
Course Learning		• • • • • • • • • • • • • • • • • • • •				
Outcomes	CLO 2 a CLO 3 a CLO 4 le	On successful completion of this course, students should be able to:  CLO 1 learn to appreciate the causes, functions, development, and evolution of animal behaviour  CLO 2 appreciate the complexity of interactions between environmental selective pressures and animal behaviour  CLO 3 appreciate current theories that form basis for modern understanding of animal behaviour  CLO 4 learn the scientific reasoning and methodology in the field of Animal Behaviour  CLO 5 think analytically in terms of behavioural ecology, animal socio-behavioural complexity, and how the				
		, ,	behaviour contributes to its conserva	•	<b>3</b> ,	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in c	BIOL2306; and one of the following course tudents who have passed	es: BIOL3301, BIOL3313, BIOL3319, I in BIOL4303	BIOL3320 or BIOL3419		
Offer in 2017 - 2018	N Of	fer in 2018 - 2019 : Y		Examination		
Grade Descriptors (A+ to F)	В	excellent use of named exar of fundamental concepts to of effective presentation skills degree level.  Evidence of a good grasp of and some case studies. Ev outstanding) abilities of indi- general command of acquire	sp of the subject in a broader comparative per mples and case studies. Evidence of independ draw insightful and logical conclusions. Show on with excellent analytical argumentation. Excel f the subject as demonstrated by some backgroidence of good critical thought, although no ependent work, effective presentation skills verted knowledge to draw meaningful and logical verted knowledge to draw meaningful and logical properties.	ent critical thought with excellen pagerness to learn, great abilities ent or outstanding work relative ound reading and appropriate us t necessarily original. Good an with good analytical and logical	t use of a broad range s of independent work, to what is required at se of named examples d very good (but not	
		required at degree level.  Demonstrate an adequate, but not coherent and incomplete grasp of the subject, with limited background reading and limited us of named examples and case studies. Some abilities of logical critical thinking, but not insightful and/or independent; only partia abilities to use acquired knowledge and work independently to draw meaningful conclusions. Fair presentation skills, with mostl correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.				
	С	Demonstrate an adequate, be of named examples and cas abilities to use acquired known	se studies. Some abilities of logical critical thin wledge and work independently to draw mean	ubject, with limited background roking, but not insightful and/or incingful conclusions. Fair presenta	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly	
	C D Fail	Demonstrate an adequate, bo finamed examples and cas abilities to use acquired kno correct argumentation, but lilevel.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require No evidence of basic minit	se studies. Some abilities of logical critical thin wledge and work independently to draw mean imited (or no) abilities to integrate broader con the subject, but partial and limited to the most e of background reading, limited abilities of critically weak logical argumentation and restrict d at degree level. mum knowledge and understanding of the s	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentencepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and noted ability of drawing approprieubject. No evidence of backgrups with the part of the properties of th	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case of particularly effective te conclusions. Work ound reading and no	
	D	Demonstrate an adequate, bo finamed examples and cas abilities to use acquired kno correct argumentation, but level.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require No evidence of basic minifamiliarity with any relevant to	se studies. Some abilities of logical critical thin wledge and work independently to draw mean imited (or no) abilities to integrate broader con if the subject, but partial and limited to the most e of background reading, limited abilities of critically weak logical argumentation and restricted at degree level.	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentencepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and nited ability of drawing appropriation. No evidence of backgrice of coherent logical thought, in	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case ot particularly effective te conclusions. Work bound reading and no neffective presentation	
Course Type	D Fail	Demonstrate an adequate, bo finamed examples and cas abilities to use acquired kno correct argumentation, but level.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require No evidence of basic minifamiliarity with any relevant to	se studies. Some abilities of logical critical thin whedge and work independently to draw mean imited (or no) abilities to integrate broader coffithe subject, but partial and limited to the most e of background reading, limited abilities of critical at degree level. In the work logical argumentation and restricted at degree level. In the work would be and understanding of the sexamples and case studies. Inadequate evider and no abilities to draw meaningful conclusion.	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentencepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and nited ability of drawing appropriation. No evidence of backgrice of coherent logical thought, in	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case ot particularly effective te conclusions. Work bound reading and no neffective presentation	
Course Teaching	D Fail	Demonstrate an adequate, be of named examples and cast abilities to use acquired kno correct argumentation, but li level.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require No evidence of basic minifamiliarity with any relevant skills with poor argumentatio with laboratory componen	se studies. Some abilities of logical critical thin whedge and work independently to draw mean imited (or no) abilities to integrate broader coffithe subject, but partial and limited to the most e of background reading, limited abilities of critical at degree level. In the work logical argumentation and restricted at degree level. In the work would be and understanding of the sexamples and case studies. Inadequate evider and no abilities to draw meaningful conclusion.	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentencepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and nited ability of drawing appropriation. No evidence of backgrice of coherent logical thought, in	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case ot particularly effective te conclusions. Work bound reading and no neffective presentation	
Course Teaching	D Fail Lecture v	Demonstrate an adequate, be of named examples and cas abilities to use acquired kno correct argumentation, but li level.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require No evidence of basic minit familiarity with any relevant skills with poor argumentatio vith laboratory componen	se studies. Some abilities of logical critical thin whedge and work independently to draw mean imited (or no) abilities to integrate broader confirmed in the subject, but partial and limited to the most e of background reading, limited abilities of critically weak logical argumentation and restricted at degree level. In mumknowledge and understanding of the sexamples and case studies. Inadequate evider and no abilities to draw meaningful conclusion to course.	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentancepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and noted ability of drawing appropriated by the concepts. No evidence of backgrice of coherent logical thought; incons. Work fails to reach degree in	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case ot particularly effective te conclusions. Work bound reading and no neffective presentation evel.	
Course Teaching	D Fail Lecture v	Demonstrate an adequate, be of named examples and cast abilities to use acquired kno correct argumentation, but li level.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require. No evidence of basic minifamiliarity with any relevant eskills with poor argumentatio with laboratory componen.	se studies. Some abilities of logical critical thin whedge and work independently to draw mean imited (or no) abilities to integrate broader co fithe subject, but partial and limited to the most e of background reading, limited abilities of critical at degree level. In mum knowledge and understanding of the sexamples and case studies. Inadequate evider and no abilities to draw meaningful conclusion to COURSE.	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentancepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and noted ability of drawing appropriated by the concepts. No evidence of backgrice of coherent logical thought; incons. Work fails to reach degree in	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case ot particularly effective te conclusions. Work bound reading and noneffective presentation evel.	
Course Teaching	D Fail Lecture v Activitie Lectures	Demonstrate an adequate, be of named examples and cas abilities to use acquired kno correct argumentation, but li level.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require No evidence of basic minifamiliarity with any relevant skills with poor argumentatio with laboratory componen	se studies. Some abilities of logical critical thin whedge and work independently to draw mean imited (or no) abilities to integrate broader confirmed in the subject, but partial and limited to the most e of background reading, limited abilities of critical and limited abilities of critical argumentation and restricted at degree level. In the second of the sexamples and case studies. In adequate evider and no abilities to draw meaningful conclusion to course   Details  including field trips, site visits, intelegible and work and the sexamples and case studies.	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentancepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and noted ability of drawing appropriated by the concepts. No evidence of backgrice of coherent logical thought; incons. Work fails to reach degree in	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case ot particularly effective the conclusions. Work bound reading and noneffective presentation evel.  No. of Hours 24	
Course Teaching	Fail  Lecture v  Activitie Lectures Laborato Project v	Demonstrate an adequate, be of named examples and cas abilities to use acquired kno correct argumentation, but li level.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require No evidence of basic minifamiliarity with any relevant skills with poor argumentatio with laboratory componen	se studies. Some abilities of logical critical thin whedge and work independently to draw mean imited (or no) abilities to integrate broader co if the subject, but partial and limited to the most e of background reading, limited abilities of critically weak logical argumentation and restricted at degree level.  mum knowledge and understanding of the sexamples and case studies. Inadequate evider and no abilities to draw meaningful conclusion to course  Details  including field trips, site visits, interessions, classroom debates	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentancepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and noted ability of drawing appropriated by the concepts. No evidence of backgrice of coherent logical thought; incons. Work fails to reach degree in	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case of particularly effective stee conclusions. Work bound reading and no neffective presentation evel.  No. of Hours  24  32	
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture v  Activitie Lectures Laborato Project v	Demonstrate an adequate, be of named examples and cas abilities to use acquired kno correct argumentation, but li level.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require. No evidence of basic minifamiliarity with any relevant skills with poor argumentatio with laboratory components.	se studies. Some abilities of logical critical thin whedge and work independently to draw mean imited (or no) abilities to integrate broader co if the subject, but partial and limited to the most e of background reading, limited abilities of critically weak logical argumentation and restricted at degree level.  mum knowledge and understanding of the sexamples and case studies. Inadequate evider and no abilities to draw meaningful conclusion to course  Details  including field trips, site visits, interessions, classroom debates	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentancepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and noted ability of drawing appropriated by the concepts. No evidence of backgrice of coherent logical thought; incons. Work fails to reach degree in	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case of particularly effective site conclusions. Work bound reading and no neffective presentation evel.  No. of Hours  24  32  8	
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail  Lecture v  Activitie Lectures Laborato Project v Reading	Demonstrate an adequate, bo of named examples and cas abilities to use acquired kno correct argumentation, but li level.  Demonstrate some grasp of studies. Insufficient evidence presentation skills with gen barely meets what is require No evidence of basic minif familiarity with any relevant skills with poor argumentatio with laboratory componen ession.	se studies. Some abilities of logical critical thin whedge and work independently to draw mean imited (or no) abilities to integrate broader co if the subject, but partial and limited to the most e of background reading, limited abilities of critically weak logical argumentation and restricted at degree level.  mum knowledge and understanding of the sexamples and case studies. Inadequate evider and no abilities to draw meaningful conclusion to course  Details  including field trips, site visits, interessions, classroom debates  project work review	ubject, with limited background riking, but not insightful and/or incingful conclusions. Fair presentancepts. Work sufficient for what basic concepts, examples, and ical independent thinking, and nited ability of drawing appropriate ubject. No evidence of background for coherent logical thought; it ons. Work fails to reach degree in active practical/visual	sufficient for what is eading and limited use dependent; only partial ation skills, with mostly is required for degree limited (or none) case of particularly effective te conclusions. Work bound reading and noneffective presentation evel.  No. of Hours  24  32  8 60  Assessment Methods to CLO	

Required/recommended reading and online materials	Bolhuis J.J. & Giraldeau L.A. The Behavior of Animals: Mechanisms, Function, and Evolution (Blackwell Publishing 2005)  Danchin E., Giraldeau L-A. & Cezilly F. Behavioural Ecology (Oxford University Press 2008)  Dugatkin L.A. Principles of Animal Behavior (2nd edition) (W.W. Norton & Company 2009)  Breed M.D. & Moore J. (eds). Encyclopedia of Animal Behavior (Academic Press 2010)
Course Website	http://www.biosch.hku.hk/ecology/lsc
Additional Course Information	Offer in alternate year from 2015-2016 This course will be offered subject to a minimum enrollment number and availability of teachers.

BIOL3105	Animal I	physiology and env	ironmental adaptation (6 credit	s) Academic Ye	<b>ar</b> 2017		
Offering Department	Biological		,	Quota	50		
Course Co-ordinator		Wong, Biological Scier	nces (olwong@hku.hk)	4277	100		
Teachers Involved		ui,Biological Sciences)	, 30 /				
	(Prof A O L Wong, Biological Sciences)						
	(Prof A S T Wong, Biological Sciences)						
Course Objectives	habitats.	The course covers the major aspects of animal physiology for environmental adaptation in terrestrial & aquatic habitats. Stress will be given to the functional interactions between animals and the environment, especially on the mechanisms by which animals obtain resources for survival from the environment, detect environmental changes via sensory structures, and respond to adversities in the environment by altering their body forms & functions.					
Course Contents & Topics	Basic commetabolismosterrestrial Visual signal & mechan in aquation morphologian.	Basic concepts of animal adaptation to environmental changes/extreme environment; Modification of energy metabolism according to oxygen availability; Different models of gaseous exchange for aquatic, inter-tidal, and terrestrial habitats; Cross-adaptation to different environment: air-breathing fish vs diving adaptations in mammals; Visual signals & differential levels of photoreception from protozoa to mammals; Background adaptation: functions & mechanisms for color presentation; Sound wave as environmental signals: functions & mechanisms of detection in aquatic & terrestrial habitats; Echo sounding in bats for navigation without visual signals; Behavioral, morphological & physiological adaptations in hostile environment: extreme hot vs freezing cold; salinity changes in aquatic habitats & water availability in terrestrial habitats on osmoregulation, water balance & nitrogenous					
Course Learning	On succes	ssful completion of this of	course, students should be able to:				
Outcomes	CLO 1 ha	ive a broad understandi	ng on functional interactions between a				
	CLO 2 ap	preciate the role of the	environment in shaping the evolution of	f animal structures & fu	ınctions		
		mprehend a wide rang vironmental stress and	e of physiological adaptations (both environmental changes	structurally & functiona	ally) in coping with		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	OL2103 or BIOL2220 o	r BIOC2600				
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	2019 : Y	Examination	May		
Grade Descriptors	Α		stery at an advanced level of extensive know	ledge required for attaining	,		
(A+ to F)	В	outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills. Writings mostly demonstrate informed, thoughtful intellectual engagement with broad range of relevant concepts.  C Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills. Writings mostly indicate informed, intellectual engagement with concepts or theories but not always with sufficient depth, breadth or understanding.  D monstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational skills. Writings indicate some intellectual engagement with concepts or theories but mostly at a superficial level.					
	Fail						
		or theories. Writings are irre			·		
Course Type		ased course					
	Activities		Details		No. of Hours		
Course Teaching	Lectures				36		
Course Teaching							
Course Teaching	Tutorials				12		
Course Teaching & Learning Activities	Tutorials Reading /	Self study			12 100		
Course Teaching & Learning Activities Assessment Methods	Tutorials	•	Details	Weighting in final course grade (%)	12 100 Assessment Methods		
Course Teaching & Learning Activities Assessment Methods	Tutorials Reading /	,	Details		12 100 Assessment		
Course Teaching & Learning Activities Assessment Methods	Tutorials Reading / Methods	,		course grade (%)	12 100 Assessment Methods to CLO Mapping CLO 1,2,3		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Tutorials Reading / Methods  Examinat Test Christophe Richard W	ion er D. Moyes & Patricia N /. Hill, Gordon A. Wyse (	test & continual assessment  J. Schulte (2015), Principles of Animal  Margaret Anderson (2012), Animal F	course grade (%)  75 25 Physiology, Pearson. Physiology, Sinauer Ass	12 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Tutorials Reading / Methods Examinat Test Christophe Richard W E. N. Mari	ion er D. Moyes & Patricia N /. Hill, Gordon A. Wyse o eb (2012), Essentials of	test & continual assessment  1. Schulte (2015), Principles of Animal	course grade (%)  75 25 Physiology, Pearson. Physiology, Sinauer Ass	12 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials Course Website Additional Course	Tutorials Reading / Methods Examinat Test Christophe Richard W E. N. Mari http://moo	ion er D. Moyes & Patricia N /. Hill, Gordon A. Wyse (	test & continual assessment  J. Schulte (2015), Principles of Animal Margaret Anderson (2012), Animal F Human Anatomy & Physiology. Benja	course grade (%)  75 25 Physiology, Pearson. Physiology, Sinauer Ass	12 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3		

BIOL3107	Plant physiology (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	30
Course Co-ordinator	Dr W K Yip, Biological Sciences (wkyip@hku.hk)		
Teachers Involved	(Dr W K Yip,Biological Sciences)		
Course Objectives	To give an understanding of plant processes such as plant growth and mechanisms.	development and	their regulatory
Course Contents	Discovery, assay, chemical nature, mechanism, structure-activity relationships	s, physiological ef	fects, and signal

& Topics	transduction of plant hormones. Hormonal transport. Selected topics on plant growth and development including photo-morphogenesis, seed germination, dormancy, apical dominance, fruit ripening, leaf abscission, and plant defense.					
Course Learning	On succe	ssful completion of t	his course, students should b	e able to:		
Outcomes	CLO 1	understand the stud	y of plant biology using mutar	nts in model plant Arabidopsis		
	CLO 2	understand biotechn	ological opportunities by mar	nipulating plant gene expression		
	CLO 3	understand the regu	lation of plant growth and dev	velopment by various plant hormone	es	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2103					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018	3 - 2019 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	Α			d presentation, the discussion would be very ht in to the practical aims; submit good repor		
(7.1. 10.1.)	В	questions. In practical	sessions: full understanding of the pr	sentation, the discussion would be a comple ractical aims; submit accurate reports.	•	
	С					
	D			vledge of the material is evident, but there a that are unduly brief would fall into this categ		
	Fail  In written examination and practical sessions: Poor knowledge and understanding of the subject, a lack of coherent and organization, and answers are largely irrelevant.					
Course Type	Lecture w	ith laboratory compo	onent course			
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laborato	гу			24	
	Tutorials				6	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examinat	ion		75	CLO 1,2,3	
	Laborato	ry reports		25	CLO 3	
Required/recommended reading and online materials	P. J. Davis: Plant Hormones: Physiology, Biochemistry and Molecular Biology (Martinus Nijhoff Publishers, 19 2nd ed.) P. J. Davis: Plant Hormones: Biosynthesis, Signal Transduction, Action! (Springer Netherlands, 2010) Lecturing materials and journal articles will be posted on HKU Moodle.					
Course Website	http://mod	dle.hku.hk/				
Additional Course Information	This cours	se will be offered sul	oject to a minimum enrollmen	t number and availability of teachers	S.	

BIOL3108	Microbial physiology (6 credits)  Academic Year									
Offering Department		Il Sciences	Quota	50						
Course Co-ordinator	Dr A Yan	Dr A Yan, Biological Sciences (ayan8@hku.hk)								
Teachers Involved	(Dr A Yar	(Dr A Yan,Biological Sciences)								
Course Objectives	pharmace molecula foundatio Upon cor able to re	s are amazing and important entities on earth. Knowle- eutics, biotechnologies, diseases control, and biogeochem ir basis for understanding of these important processes ons for sub-disciplines of Microbiology, such as environm impletion, students will acquire fundamental knowledge an elate knowledge to various microbial applications.	nical process and applica nental, indus nd methodolo	es. Microbial Ph tions, and to se trial, and medici ogies for microbia	ysiology provides erve as essential nal Microbiology. al studies and be					
Course Contents & Topics	organized these the including microbes metabolishighly inf	as a fundamental course for the understanding of the word and presented in three themes: 'Microbial Rules', 'Microree themes, a broad range of highly educationa: 'Microorganisms and their position in the living world', 'Microbial structures and functions', 'Microbial growth'sm', and 'Regulation and control of metabolic Activities'. T teractive tutorial session following each of the topics sung, and problem-based learning experiences.	obial Breath al and inte 'Fundamenta n and contro Topics are ta	', and 'Microbial Fresting topics al methodologies ol', 'Energy Gen ught in a cohere	Adaption'. Under are presented for the study of eration', 'Central nt manner with a					
Course Learning		essful completion of this course, students should be able to:	:							
Outcomes	CLO 1	appreciate the diversity of microbial metabolisms and the st	trategies for t	heir adaptive res	ponses					
	CLO 2	comprehend the principles underlying the dynamic nature of	of microbial p	hysiology						
	CLO 3	CLO 3 relate knowledge to practical application of microbes in industry and medicine								
	CLO 4	CLO 4 develop abilities to read and assess scientific literature in microbiology area								
Pre-requisites (and Co-requisites and Impermissible combinations)		3IOC2600 or BIOL2103 or BIOC3604								
Offer in 2017 - 2018	N Of	fer in 2018 - 2019 : N		Examination						
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive leads on the continuation of the continuati	king, with evide	nce of original though	nt, and ability to apply					
	В	B Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills.								
	С	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills.								
	D	Demonstrate partial but limited command of knowledge required for evidence of some coherent and logical thinking, but with limited and knowledge to solve problems. Apply limited or barely effective organizations.	alytical and crit							
	Fail	Demonstrate little or no evidence of command of knowledge require analytical and critical abilities, logical and coherent thinking. Show ver	red for attaining							

	Organizational skill	s are minimally effective or ineffective.					
Course Type	Lecture-based course						
Course Teaching	Activities	No. of Hours					
& Learning Activities	Lectures			36			
	Tutorials			12			
	Project work			2			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		20	CLO 1,2,3,4			
	Examination		50	CLO 1,2,3			
	Test	mid-term	30	CLO 1,2,3			
Required/recommended reading and online materials	Woolverton, published by Supplementary Reading:	riology: Kenneth Tobar, U. of Wis	•	·			
Course Website	http://moodle.hku.hk/	· ·					
Additional Course Information	This course will be offered	subject to a minimum enrollment nu	umber and availability of teachers	S.			

BIOL3109	Enviror	nmental microbio	logy (6 credits)	Academic	<b>Year</b>   2017
Offering Department		al Sciences	,	Quota	40
Course Co-ordinator		u, Biological Science	s (jdgu@hku.hk)	1	-
Teachers Involved		Gu,Biological Science			
Course Objectives	such as biodegra	cycling of chemical education of environment	ne role of various microorganisms elements, interactions with plants ntally important pollutants. Select poesses. Key concepts are illustrate	and animals, and the way i tive groups of microorganism	n which they carry ou m will be examined i
Course Contents & Topics	<ol> <li>Contril</li> <li>Microb</li> <li>Microb</li> </ol>	bution of microbial me bial interactions with p bial metabolism of org	bial diversity, ecology and growth etabolism to biogeochemical proce plants and animals ganic compounds, metals and mar ield microbiological research techr	n-made polymers	nutrients
Course Learning	On succe	essful completion of the	his course, students should be ab	e to:	
Outcomes		inderstand a range o piochemical capability	of microorganisms in the environm and host range	nent in terms of their roles a	nd function as well a
	n	microorganisms and th	piochemical processes, enzymes heir distribution in the environmen	t	carried by selective
			techniques in environmental and i	nicrobiai research	
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in E	BIOL2103			
Offer in 2017 - 2018	Y 2n	nd sem Offer in 2018	8 - 2019 : Y	Examination	on May
Grade Descriptors (A+ to F)	Α		n advanced level of extensive knowledge		
		original thought. Apply	highly effective lab skills and techniques.		
	В	original thought. Apply conclusions. Apply high Substantial command outcomes. Substantial		Critical use of data and results to dra anal skills. Ils required for attaining at least n nalytical and critical abilities and log	aw appropriate and insightf nost of the course learnin ical thinking. Apply effectiv
	В	original thought. Apply conclusions. Apply high Substantial command outcomes. Substantial lab skills and technique presentational skills. General but incomplete but incomplete grasp effective lab skills and Apply moderately effec	highly effective lab skills and techniques. In the effective organizational and presentatic of a broad range of knowledge and ski grasp of the subject. Show evidence of all uss. Correct use of data of results to dree command of knowledge and skills required for the subject. Evidence of some analytic techniques. Mostly correct but some errotive organizational skill	Critical use of data and results to dra nal skills.  Ils required for attaining at least n nalytical and critical abilities and log w appropriate conclusions. Apply or ed for attaining most of the course cal and critical abilities and logical neous use of data and results to dr s.	aw appropriate and insights nost of the course learnin ical thinking. Apply effective effective organizational an learning outcomes. Generathinking. Apply moderatel aw appropriate conclusions
		original thought. Apply conclusions. Apply high Substantial command outcomes. Substantial lab skills and technique presentational skills. General but incomplete but incomplete grasp effective lab skills and Apply moderately effect Partial but limited com limited grasp, with reteil limited analytical and cappropriate conclusion:	highly effective lab skills and techniques. In hy effective organizational and presentatic of a broad range of knowledge and ski grasp of the subject. Show evidence of an ues. Correct use of data of results to draw e command of knowledge and skills required for the subject. Evidence of some analytitechniques. Mostly correct but some errotive organizational and presentational skill mand of knowledge and skills required finition of some relevant information, of the scritical abilities. Partially effective lab skills s. Apply limited or barely effective organiz.	Critical use of data and results to dra nal skills. Ils required for attaining at least nalytical and critical abilities and log wappropriate conclusions. Apply of the defendence of a data and critical abilities and logical and critical abilities and logical neous use of data and results to drs. Or attaining some of the course leasubject. Evidence of some coherent and techniques. Limited ability to utional and presentational skills.	aw appropriate and insights nost of the course learnin ical thinking. Apply effective fective organizational an learning outcomes. Generathinking. Apply moderatel aw appropriate conclusions: rning outcomes. Partial buand logical thinking, but will see data and results to dra
	C D	original thought. Apply conclusions. Apply high Substantial command outcomes. Substantial lab skills and technique presentational skills. General but incomplete but incomplete grasp effective lab skills and Apply moderately effect Partial but limited com limited grasp, with retelimited analytical and cappropriate conclusion: Little or no evidence of or no grasp of the known and coherent thinking, draw appropriate concludes.	highly effective lab skills and techniques. In hy effective organizational and presentatic of a broad range of knowledge and ski grasp of the subject. Show evidence of an uses. Correct use of data of results to draw the command of knowledge and skills required for the subject. Evidence of some analytitechniques. Mostly correct but some errotive organizational and presentational skill required for the subject and the subject leviate organizational and presentational skills required for the subject of the subject leviate organizational and presentational skills. Apply limited or barely effective lab skills required for mand of knowledge and skills required for the subject. Minimally effective or ineffective lab skill fusions. Organization and presentational slives.	Critical use of data and results to dra nal skills. Ils required for attaining at least in nalytical and critical abilities and log wappropriate conclusions. Apply of the defendence of the course cal and critical abilities and logical neous use of data and results to draw of the course cal and critical abilities and logical neous use of data and results to draw of the course leavibject. Evidence of some coherent and techniques. Limited ability to use the course learning the course learning Evidence of little or lack of analyticals and techniques. Misuse of data as and techniques.	aw appropriate and insights nost of the course learnin ical thinking. Apply effective fective organizational an learning outcomes. Generathinking. Apply moderatel aw appropriate conclusions ruing outcomes. Partial but and logical thinking, but will see data and results to dra outcomes. Evidence of littl I and critical abilities, logical results and/or unable to
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Required/recommended reading and online materials	M.T. Madigan, J. M. Martinko, P.V. Dunlap and D.P. Clark: Brock Biology of Microorganisms (Pearson/Benjamin Cummings, 2009, 12th ed.) R.M. Atlas and R. Bartha: Microbial Ecology: Fundamentals and Applications (Benjamin Cummings, 1998, 4th ed.) References Molecular Biology of the Cell - Fifth Edition by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter (December 2007) R. Mitchell and JD. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)
Course Website	http://moodle.hku.hk/
Additional Course Information	This course will be offered subject to a minimum enrollment number and availability of teachers.

Offering Department Course Co-ordinator Dr J D Gu, Biological Sciences (gdu@hku.hk) Course Objectives  Solutions of Department Course Objectives Solutions of Department o	BIOL3110	Environ	mental toxicolog	gy (6 credits)	Academic Year	r 2017		
Teachers involved Course Objectives  To introduce students to the basic principles of environmental and ecological toxicology by analysis of the far pollutants in lithosphere, hydrosphere, atmosphere and biosphere. Mechanisms of toxicity as dose-response be analyzed through adsorption, metabolism, toxicity and elimination. Major metabolic processes and enzy involved will be highlighted. Specific cases of toxicity will be presented and discussed.  1. Environmental chemistry of pollutants and their toxicity and factors governing toxic effects, bioaccumulation biomagnification  2. Partitioning and transformation of environmental pollutants  3. Quantitative toxicology using dose-response approaches  4. Emerging endocrine-disrupting chemicals and carcinogens at molecular levels  5. Elimination of pollutants from the environments  6. Laboratory testing of toxicity and review various adsorption isotherm models  On successful completion of this course, students should be able to.  CLO 2 understand toxicity through adsorption, metabolism, elimination and target site and quantitative analysis continued to the control of the control of the control of the course of the control of the control of the course of the control of the c	Offering Department			,	Quota	60		
To introduce students to the basic principles of environmental and ecological toxicology by analysis of the far pollutants in lithosphere, hydrosphere, atmosphere and biosphere. Mechanisms of toxicity as dose-response be analyzed through adsorption, metabolism, toxicity and elimination. Major metabolic processes and enzy involved will be highlighted. Specific cases of toxicity will be presented and discussed.  3. Topics  3. Topics  3. Topics  3. Topics  4. Emerging endocrine-disrupting chemicals and carcinogens at molecular levels 5. Elimination of pollutants from the environmental pollutants. 3. Quantitative toxicology using dose-response approaches 4. Emerging endocrine-disrupting chemicals and carcinogens at molecular levels 5. Elimination of pollutants from the environments 6. Laboratory testing of toxicity and review various adsorption isotherm models CI.O 1 understand fate and distribution of chemicals in various compartments of the ecosystem CI.O 2 understand toxicity through adsorption, metabolism, elimination and target site and quantitative analysis CI.O 3 understand appropriate techniques in environmental cleaning up Pre-requisites and Co-requisites and Co-requisites and Co-requisites and Co-requisites and Impermissible combinations Differ in 2017 - 2018  5. Elimination of pollutants transformation at a combination of the company of the combinations of the company of the combinations of the company of the combinations of the company of the combination of the	Course Co-ordinator	Dr J D Gu	u, Biological Science	s (jdgu@hku.hk)				
pollutants in lithosphere, hydrosphere, atmosphere and biosphere. Mechanisms of toxicity as dose-response be analyzed through adsorption, metabolism, toxicity and elimination. Major metabolic processes and enzy involved will be highlighted. Specific cases of toxicity will be presented and discussed.  1. Environmental chemistry of pollutants and their toxicity and factors governing toxic effects, bioaccumulation biomagnification 2. Partitioning and transformation of environmental pollutants 3. Quantitative toxicology using dose-response approaches 4. Emerging endocrine-disrupting chemicals and carcinogens at molecular levels 5. Elimination of pollutants from the environments 6. Laboratory testing of toxicity and review various adsorption isotherm models On successful completion of this course, students should be able to: CLO 1 understand fact and distribution of chemicals in various compartments of the ecosystem CLO 2 understand mechanism of toxicity from specific pollutants of choice CLO 4 understand sheechanisms of toxicity from specific pollutants of choice CLO 4 understand sheechanisms of toxicity from specific pollutants of choice CLO 4 understand sheechanisms of toxicity from specific pollutants of choice CLO 5 understand mechanism of toxicity from specific pollutants of choice CLO 5 understand appropriate techniques in environmental cleaning up Pre-requisites and Co-requisites and Co-req	Teachers Involved	(Dr J D G	u,Biological Science	es)				
biomagnification 2. Partitioning and transformation of environmental pollutants 3. Quantitative toxicology using dose-response approaches 4. Emerging endocrine-disrupting otherwized and carcinogens at molecular levels 5. Elimination of pollutants from the environments 6. Laboratory testing of toxicity and review various adsorption isotherm models CLO 1 understand for the and distribution of chemicals in various compartments of the ecosystem CLO 2 understand toxicity through adsorption, metabolism, elimination and target site and quantitative analysis CLO 3 understand mechanism of toxicity from specific pollutants of choice CLO 4 understand specific biochemical processes and enzymes involved in pollutants transformation of mineralization and co-requisites and impermissible combinations) CLO 5 understand appropriate techniques in environmental cleaning up Pass in BIOL2103 or CHEM3141 or ENVS3042  Y 2nd sem Offer in 2018 - 2019 : Y Examination May Trade Descriptors (A+ to F)  Y 2nd sem Offer in 2018 - 2019 : Y Examination May Trade Descriptors (A+ to F)  B 3 Wabstantial command of a broad range of knowledge and stills required for attaining at the course learning outcombinations of the subject. Elved or distance of data and reliable and reliable and the course learning outcombinations and presentational stills to fermi administration of the course learning outcombinations and presentational stills. The course learning outcomes of but incomplete combinations and presentational st	Course Objectives	pollutants be analyz	pollutants in lithosphere, hydrosphere, atmosphere and biosphere. Mechanisms of toxicity as dose-re be analyzed through adsorption, metabolism, toxicity and elimination. Major metabolic processes an involved will be highlighted. Specific cases of toxicity will be presented and discussed.					
On successful completion of this course, students should be able to:  CLO 1 understand fate and distribution of chemicals in various compartments of the ecosystem CLO 2 understand toxicity through adsorption, metabolism, elimination and target site and quantitative analysis of close CLO 4 understand specific biochemical processes and enzymes involved in pollutants transformation at mineralization CLO 5 understand appropriate techniques in environmental cleaning up Pass in BIOL2103 or CHEM3141 or ENVS3042  Pass in BIOL2103 or CHE		biomagnit 2. Partitio 3. Quantit 4. Emergi 5. Elimina	fication oning and transforma tative toxicology usir ing endocrine-disrup ation of pollutants fro	ntion of environmental pollutants ng dose-response approaches ting chemicals and carcinogens at moleculum the environments	ular levels	oaccumulation ar		
CLO 3 understand specific biochemical processes and enzymes involved in pollutants transformation of mineralization and specific biochemical processes and enzymes involved in pollutants transformation of mineralization and propriate techniques in environmental cleaning up  Pass in BIOL2103 or CHEM3141 or ENVS3042    Pass in BIOL2103 or CHEM3141 or ENVS3042		On succe	essful completion of to nderstand fate and co	his course, students should be able to: listribution of chemicals in various compar	tments of the ecosystem	iitati ya anal yais		
CLO 5 understand appropriate techniques in environmental cleaning up  Pass in BIOL2103 or CHEM3141 or ENVS3042  Pass in BIOL2103 or CHEM3141 or ENVS3042  A Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. (A+ to F)  A Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Apply highly effective lab skills and techniques. Critical or data and results to draw appropriate and inition conclusions. Apply highly effective lab skills and techniques. Correct use of data of results to draw appropriate and inition to effective lab skills and techniques. Correct use of data of results to draw appropriate and inition to effective lab skills and techniques. Correct use of data of results to draw appropriate and inition conclusions. Apply indiple effective or data in the skills of a desinder conclusions. Apply effective or applicational and presentational skills.  C General but incomplete command of knowledge and skills required for attaining and least most of the course learning outcomes. Set with the skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply moder effective leaves and the skills and explained and results to draw appropriate conclusions. Apply moder effective leaves and skills required for attaining some of the course learning outcomes. Particularly effective or applicational and presentational skills.  D Partial but limited analytical and critical abilities. Particularly effective lab skills and techniques. Limited abilities and results to draw appropriate conclusions. Apply immediate elevant informational skills and techniques. But the course learning outcomes. Particularly effective or interfective or generational skills.  D Examination with aboratory component course.  Fall Little or ne vidence of command of knowledge and skills required for attaining and critical abilities. And other and presentational skills are mini		CLO 3 ur	nderstand mechanis nderstand specific	m of toxicity from specific pollutants of ch	oice			
Pre-requisites and Impormissible combinations)  Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. (A+ to F)  A Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. (A+ to F)  A Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. (A+ to F)  B Substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial command of a broad range of knowledge and skills required for attaining most of the course learning outcomes. Of the control of the course learning outcomes. Of the control of the course learning outcomes. Of the course of the course learning outcomes. Of the course learning				te techniques in environmental cleaning u	n			
A Through mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes for the subject nature. Show very storing analytical and critical abilities and high biggiotal thinking, with evidence original thought. Apply highly effective last skills and techniques. Critical use of data and results to draw appropriate and insignoculous conclusions. Apply highly effective organizational and presentational skills.  B Substantial command of a broad range of knowledge and skills required for attaining at least most of the course leave the skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.  C General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. See but incomplete graps of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moder effective las skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moder effective las skills and explained and critical abilities. Partially effective organizational and critical abilities and logical thinking. Apply moder effective las skills and explained and critical abilities. Partially effective by a skills required for attaining most of the course learning outcomes. Particularly apply intended command of knowledge and skills required for attaining and critical abilities. Partially effective by a skills and techniques. Limited ability to use data and results and constructions and particularly and critical abilities. Partially effective by a skills and techniques. Limited ability to use data and results and or no graps of the knowledge and understanding of the subject. Evidence of unallytical and critical abilities. Partially effective originational and presentational abilities and learning abilities and learning and critical abilities. Partially effective originational and pare	and Co-requisites and Impermissible combinations)	Pass in B	BIOL2103 or CHEM3	141 or ENVS3042				
Thorough grasp of the subject matter. Show very strong analytical and critical abilities and high logical thinking, with eviden original thought. Apply highly effective lab skills and techniques. Circlical use of data and results to draw appropriate and instructional skills.  B Substantial command of a broad range of knowledge and skills required for attaining at least most of the course lear outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply reflective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply mefective presentational skills.  C General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Ge but incomplete grasp of the subject. Evidence of some analytical and critical abilities and techniques. Limited ability to an derival to abilities. Mostly correct but some ernoeus use of data and results to draw appropriate conclus Apply moderately effective origanizational and presentational skills.  D Partial but limited command of knowledge and skills required for attaining most of the course learning outcomes. See but incomplete grasp of the subject. Evidence of some analytical and critical abilities. Partially effective lab skills and techniques. Limited ability to use data and results to appropriate conclusions. Apply limited or barely effective origanizational and presentational skills.  Fail Little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Evidence of or no grasp of the knowledge and understanding of the subject. Evidence of intellined ability to use data and results and consists and coherent thinkings. Minimally effective or infective tab skills and techniques. Minimal development course and coherent thinkings. Minimally effective and skills required ratial ingle the course dark and results an								
Substantial command of a broad range of knowledge and skills required for attaining at least most of the course lear outcomes. Substantial graps of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply effective organizational presentational skills.  C General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Ge but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moder effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.  D Partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial imited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but imited analytical and critical abilities. Partially effective latilis and techniques. Limited ability to use data and results to appropriate conclusions. Apply limited or barely effective organizational and presentational skills.  Fail Little or no evidence of command of knowledge and skills and techniques. Limited ability to use data and results to appropriate conclusions. Apply limited or barely effective organizational and presentational skills.  Et all title or no evidence of command of knowledge and skills and techniques. Limited ability to use data and results or or no grasp of the knowledge and skills and techniques. Limited ability to use data and results or or no grasp of the knowledge and skills and techniques. Limited ability to use data and results or or no grasp of the knowledge and skills and techniques. Limited ability to use data and results or or or or grasp of the knowledge and skills required for attaining some of the course learning outcomes. Partial strain and presentational skills.  Ecutive Table 1.  Fail Little or overline 1.	•	Thorough grasp of the subject matter. Show very strong analytical and critical abilities and high logical thinking, with evidence o original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightfu						
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limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but limited analytical and critical abilities. Partially sand techniques. Limited ability to use data and results to appropriate conclusions. Apply limited or barely effective organizational and presentational skills.    Fail		General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, it and coherent thinking. Minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unat draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.  Lecture with laboratory component course  Course Teaching & Learning Activities  Lectures  Lectures  Lectures  Lectures  Lectures  Lectures  Laboratory  Reading / Self study  Details  Weighting in final course grade (%)  Methods  Details  Weighting in final course grade (%)  Methods  Examination  Examination  Student-based assessment includes laboratory report, assignment, presentations or other forms  Required/recommended  Preading and Course grade (%)  D.G. Crosby: Environmental Toxicology and Chemistry (Oxford, 1998)  W. Stumm, J.J. Morgan: Aquatic Chemistry: Chemical Equilibria and Rates in Natural Waters (Wiley, 1995, 3rd R. Mitchell and JD. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)  http://moodle.hku.hk/		Partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Partially effective lab skills and techniques. Limited ability to use data and results to draw						
Course Teaching & Learning Activities  Examination  Examination  Examination  Examination  Examination  Course Teaching & Lectures  Laboratory laboratory, assignment; and seminar  Examination  Examination  Examination  Examination  Details  Details  Weighting in final course grade (%)  Methods  Examination  Examination  Examination  Examination  Details  Weighting in final course grade (%)  Methods  Methods  Examination  Examination  Examination  Examination  Examination  Details  Weighting in final course grade (%)  Methods  Methods  Examination  Examination  Examination  Examination  Examination  Examination  Details  Weighting in final course grade (%)  Methods  Exams Assessment includes laboratory report, assignment, presentations or other forms  Examination  Examination		Fail  Little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to						
Lectures Laboratory   laboratory, assignment; and seminar   36   Reading / Self study   100   Assessment Methods and Weighting   Examination   Laboratory reports   Laboratory reports   Student-based assessment includes laboratory report, assignment, presentations or other forms   Unique to the course grade (%)   CLO 1,2,3   Required/recommended eading and course grade   Unique to the course	Course Type	Lecture w	vith laboratory compo	onent course				
Laboratory Reading / Self study  Methods Ind Weighting  Examination  Examination  Details  Details  Weighting in final course grade (%)  Examination  Examination  Examination  Details  Weighting in final course grade (%)  Methods  Methods  Methods  Student-based assessment includes laboratory report, assignment, presentations or other forms  Required/recommended  D.G. Crosby: Environmental Toxicology and Chemistry (Oxford, 1998)  W. Stumm, J.J. Morgan: Aquatic Chemistry: Chemical Equlibria and Rates in Natural Waters (Wiley, 1995, 3rd R. Mitchell and JD. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)  http://moodle.hku.hk/				Details		No. of Hours		
Reading / Self study  Methods  Methods  Details  Weighting in final course grade (%)  Examination  Examination  Laboratory reports  Required/recommended eading and online materials  Reading / Self study  Methods  Student-based assessment includes laboratory report, assignment, presentations or other forms  Weighting in final course grade (%)  Methods  Methods  Methods  Methods  Methods  Methods  Method to CLO  Mapping  CLO 1,2,3  Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  Required/recommended  Possible in Natural Waters (Wiley, 1995, 3rd online materials  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assignment, presentations or other forms  No Student-based assessment includes laboratory report, assi	Learning Activities							
Assessment Methods and Weighting  Methods  Details  Weighting in final course grade (%)  Examination  Examination  Laboratory reports  Student-based assessment includes laboratory report, assignment, presentations or other forms  Required/recommended reading and polline materials  Weighting in final course grade (%)  Methods  Methods  Methods  Methods  Methods  Methods  Methods  Assessment includes laboratory report, assignment presentations or other forms  Use of the presentation				laboratory, assignment; and semina	r			
Examination  Examination  Examination  Examination  Student-based assessment includes laboratory report, assignment, presentations or other forms  Examination  CLO 1,2,3  Student-based assessment includes laboratory report, assignment, presentations or other forms  Required/recommended reading and online materials  W. Sturmm, J.J. Morgan: Aquatic Chemistry: Chemical Equlibria and Rates in Natural Waters (Wiley, 1995, 3rd R. Mitchell and JD. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)  http://moodle.hku.hk/								
Laboratory reports  student-based assessment includes laboratory report, assignment, presentations or other forms  Required/recommended  D.G. Crosby: Environmental Toxicology and Chemistry (Oxford, 1998)  W. Stumm, J.J. Morgan: Aquatic Chemistry: Chemical Equlibria and Rates in Natural Waters (Wiley, 1995, 3rd R. Mitchell and JD. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)  http://moodle.hku.hk/		Methods		Details	course grade (%)	Assessment Methods to CLO Mapping		
Laboratory reports includes laboratory report, assignment, presentations or other forms  Required/recommended reading and conline materials  Course Website  Laboratory report, assignment, presentations or other forms  40 CLO 1,2,3		Examina	tion		60	CLO 1,2,3,4,		
weading and W. Stumm, J.J. Morgan: Aquatic Chemistry: Chemical Equlibria and Rates in Natural Waters (Wiley, 1995, 3rd R. Mitchell and JD. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)  http://moodle.hku.hk/		Laboratory reports		includes laboratory report, assignment, presentations or other	40	CLO 1,2,3,4,		
The state of the s	eading and	W. Stumn	n, J.J. Morgan: Aqua	Foxicology and Chemistry (Oxford, 1998) atic Chemistry: Chemical Equlibria and Ra		ley, 1995, 3rd ed		
Additional Course. This course will be offered subject to a minimum annulment number and qualibritist of teachers	Course Website							
Additional Course   This course will be onered subject to a minimum enrollment number and availability of teachers.	Additional Course			bject to a minimum enrollment number an	d availability of teachers.			

Offering Penartment   Piological Sciences   50	BIOL3201	Food chemistry (6 credits)	Academic Year	2017
Offering Department Biological Sciences Quota 50	Offering Department	Biological Sciences	Quota	50

Course Co-ordinator	Dr J C Y I	Lee, Biological Sci	ences (jettylee@hku.hk)			
Teachers Involved	,	Lee,School of Bio Cheng,School of Bi	logical Sciences) iological Sciences)			
Course Objectives	To provide a basic understanding related to food science and nutrition			ling of chemistry in food systems, and to provide practical training in chemist ition.		
Course Contents & Topics	componer properties reactions methods	nts such as enzyn s of these importar which occur durin used in analyzing to of laboratory session	nes, vitamins, minerals, colora nt constituents of foods are co g the production, processing, foods. ons will cover analysis of food	g water, proteins, carbohydrates a nts, flavorants and additives. The p vered in detail, and form the basis t storage and handling of foods, and components, protein chemistry, lipid wning reactions, and sensory analys	hysical and chemica or understanding the in understanding the oxidation, properties	
Course Learning			f this course, students should be			
Outcomes	CLO 1 ui	nderstand the fund	tions and properties of major a	nd minor food components		
	CLO 2 ui	nderstand the basi	c chemistry behind food proces	ssing		
		ave integrated the ontext	ir knowledge of biological and	d chemical principles into a food s	cience and nutrition	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	SIOC2600 or BIOL2	2103 or BIOL2220; and NOT fo ents admitted in 2016-2017 or b	r students who have passed in BIOI pefore.	_2101.	
Offer in 2017 - 2018	Y 1st	t sem Offer in 20	18 - 2019 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show extensive knowledge and understanding of the topics covered and can readily apply this knowledge. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions.					
	B Demonstrate substantial grasp of the subject matter covered. Show thorough knowledge and understanding of the co high level of competence in the topics covered and able to apply this knowledge and skills to most situations. Use la techniques and analysis of data and results to draw generally appropriate conclusions.					
	С					
	D					
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show elementary knowledge and understanding in few areas of the content and has achieved very limited competence in some of the topics covered. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions.					
Course Type	Lecture w	vith laboratory com	ponent course			
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laborato	ry			24	
	Tutorials				6	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments			30	CLO 1,2,3	
	Examination			50	CLO 1,2,3	
	Test 20 CLO 1,2,3					
Required/recommended reading and online materials			stry (Marcel Dekker 4th Ed, 200 berle, P, Food Chemistry (Spri			
Course Website	http://moc	odle hku hk/				
Additional Course	http://moodle.hku.hk/ This course will be offered subjec		subject to a minimum enrollmer	at number and availability of toocher		

BIOL3202	Nutritional biochemistry (6 credits)	Academic Year	2017					
Offering Department	Biological Sciences	Quota	100					
Course Co-ordinator	Dr C B Chan, Biological Sciences (chancb@hku.hk)							
Teachers Involved	(Dr C B Chan,Biological Sciences) (Dr J C Y Louie,Biological Sciences)							
Course Objectives	To introduce the fundamental concepts of nutrition through an integrated approach in discussing the interactions between diet and intermediary metabolism.							
Course Contents & Topics	Essential nutrients and their requirement; Metabolic control of macronutrient utilization; Metabolism of micronutrients Nutritional impacts of hexoses, long chain polyunsaturated fatty acid, cholesterol, amino acids, vitamins and minerals							
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 explain how different organs coordinate to achieve metabolic co	ntrol of glucose						
	CLO 2 understand the metabolic pathways of cholesterol and polyunsa	turated fatty acids						
	CLO 3 understand the theoretical constructs of nitrogen requirement and the importance of the urea cycle							
	CLO 4 understand the biochemical roles of micronutrient in human health							
	CLO 5 explain the biochemical outcomes of nutrient deficiency/excess							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC2600 or BIOL2220 or MEDE2301							
	V 4-4 Offen in 0040 . V	Examination	Das					
Offer in 2017 - 2018	Y 1st sem Offer in 2018 - 2019 : Y	Examination	Dec					

(A+ to F)		identification and solving. Show outstanding ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate highly effective organization / writing skills.					
	В	B Demonstrate substantial grasp of the subject matter covered. Show full ability on knowledge integration, problem identification and solving. Show reasonable ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate effective organization / writing skills.					
	С	some ability on know		ect matter covered. Might show misunderstanding teation and solving. Show some ability to analystate organization / writing skills.			
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Misunderstanding of the materials is not uncommon. Show limited ability on knowledge integration, problem identification and solving. Use elementary approaches to analyze and interpret scientific data and draw sometimes erroneous conclusions. Demonstrate basic organization / writing skills.					
	Fail	and logical thinking,	and minimal competence in proble	elevant information, of the subject matter covere em solving. Fail to integrate information and idea a and draw conclusions. Demonstrate poor organ	entify problems. Seriously		
Course Type	Lecture-b	ased course					
Course Teaching & Learning Activities	Activities		Details	Details			
	Lectures						
	Tutorials		tutorials/guided studi	tutorials/guided studies			
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		15	CLO 1,2,3,4,5		
	Examinat	ion		70	CLO 1,2,3,4,5		
	Test			15	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Gropper S.S. & Smith J. L. Advanced Nutrition and Human Metabolism. Cengage Learning, 2016 Frayn K.N. Metabolic regulation: A Human Perspective. Wiley-Blackwell, 2010 Champe P.C., Harvey R.A. & Ferrier D.R. Lippincott's Illustrated Reviews: Biochemistry. Lippincott, 2008 Gibney M.J., Macdonald I.A. & Roche H.M. Nutrition & Metabolism. Blackwell Science, 2003						
Course Website		dle.hku.hk/		<b>,</b>			
Additional Course Information	This cours	se will be offered su	ubject to a minimum enrollm	nent number and availability of teachers	S		

BIOL3203	Food m	nicrobiology (6 credi	its)	Academic Yea	r 2017	
Offering Department	Biologica	al Sciences	•	Quota	80	
Course Co-ordinator	Dr H S E	El-Nezami, Biological Scie	ences (elnezami@hku.hk)			
Teachers Involved	(Dr H S E	El-Nezami,Biological Scient	ences)			
Course Objectives			cepts and principles of food micro			
Course Contents & Topics		nce, Physical methods of	microbes in foods, Factors that food preservation, Chemical pre			
Course Learning	On succe	essful completion of this	course, students should be able to	<b>D</b> :		
Outcomes			lluating microorganisms and their			
		demonstrate an understa hat can spoil a given foo	anding of the causes of food spoi d	lage, and predict response of	a microorganisn	
		develop and implement a food	appropriate measures to control th	e spoilage and pathogenic mi	croorganisms in a	
	CLO 4 c	demonstrate the ability to	work in a team to investigate and	solve problems in food micro	biology	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOC2600 or BIOL2220				
Offer in 2017 - 2018	Y 2n	nd sem Offer in 2018 - 2	2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	В	evidence of creative ability analysis of data and result team-based organizational	sp of the subject matter covered. Show st y and competence in professional-level pi s to draw appropriate and insightful concl and presentational skills. grasp of the subject matter covered. Shi	roblem solving. Critically use lab skil usions to real-world problems. Demo	s and techniques and nstrate highly effective	
		thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.				
	С	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilitie and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrat moderately effective team-based organizational and presentational skills.				
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.				
	Fail	and logical thinking, and middata and results ineffective	asp, with retention of little relevant inform inimal competence in professional-level pr rely, leading generally to inappropriate a ss team-based organizational and presenta	oblem solving. Úse lab skills and tech nd usually erroneous conclusions to	iniques and analysis	
Course Type	Lecture v	with laboratory componer	nt course			
Course Teaching	Activities		Details No. of Hours			
& Learning Activities	Lectures		24			
	Laboratory		24			
	Tutorials		12			
	Reading	g / Self study			100	
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods o CLO Mapping	
	Assignm	nente	seminars & continuous	40	CLO 2,4	

	Examination		40	CLO 1,2	
	Laboratory reports		20	CLO 1,3	
Required/recommended reading and online materials	Food Microbiology: An Introduction, 2005, Thomas J. Montville and Karl Matthews, American Society for Microbiology (ASM) Press, Washington, DC Food Microbiology: Fundamentals and Frontiers, 2007, Edited by Michael P. Doyle, Larry R. Beuchat, and Thomas J. Montville, 3rd edition, American Society for Microbiology (ASM) Press, Washington, DC				
Course Website	http://moodle.hku.hk/				
Additional Course Information	This course will be offered subject	to a minimum enrollment numbe	r and availability of teache	rs	

BIOL3204	Nutrition	and the life cycle (	6 credits)	Academic Yea	r 2017		
Offering Department	Biological	Sciences		Quota	70		
Course Co-ordinator	DrJCYL	ouie, Biological Science	es (jimmyl@hku.hk)				
Teachers Involved		Dr C B Chan,Biological Sciences) Dr J C Y Louie,Biolgoical Sciences)					
Course Objectives	essential			cycle. This course aims to cover the utritional concerns during specific			
Course Contents & Topics	issues: ne	eaching and learning will take place through an evidence-based approach and will be organized around key sues: needs of macro- and micronutrients, as well as the physiological and psychological determinants that fluence nutrient requirements at different stages of the human life cycle. Socio-economic factors that influence etary habit and nutritional status will also be covered.					
Course Learning	On succes	n successful completion of this course, students should be able to:					
Outcomes	CLO 1 h	ave fundamental knowle	edge of essential micronutri	ent metabolism			
	CLO 2 b	e able to critically asses	s and identify the specific n	eeds at different stages of the life	cycle		
	CLO 3 re	elate the concept of requ	uirement to physiological ne	eds			
	CLO 4 u	nderstand the impact of	socio-cultural factors on nu	ıtritional status			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	ss in BIOC2600 or BIOL2220 or BIOL3202					
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2		Examination	May		
Grade Descriptors (A+ to F)	Demonstrate thorough grasp of the subject matter covered. Show exceptional ability on knowledge integration, problem identification and solving. Show outstanding ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate highly effective team-based organization and presentation skills.						
	Demonstrate substantial grasp of the subject matter covered. Show full ability on knowledge integration, problem identification and solving. Show reasonable ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate effective team-based organization and presentation skills.						
	Demonstrate general but incomplete grasp of the subject matter covered. Might show misunderstanding of the materials. Show some ability on knowledge integration, problem identification and solving. Show some ability to analyze and interpret scientific data and draw proper conclusions. Demonstrate adequately effective team-based organization and presentation skills.						
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Misunderstanding of the materials is not uncommon. Show limited ability on knowledge integration, problem identification and solving. Use elementary approaches to analyze and interpret scientific data and draw sometimes erroneous conclusions. Demonstrate team-based organization and presentation skills of limited effectiveness.					
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in problem solving. Fail to integrate information and identify problems. Seriously deficient in ability to analyze and interpret scientific data and draw conclusions. Demonstrate poor organization and presentation skills.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	;	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials		student-centered learning		12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts		20	CLO 1,2,3		
	Essay			20	CLO 2,3,4		
	Examinat	Examination 60 CLO 1,2,3,4					
			ife Cycle. Thomson, 2011	Live on Matabaliam (Madawarth			
reading and online materials				Human Metabolism (Wadsworth,			
			eiski, Triodis, Snepherd and	I Tierney. Food & Nutrition Through	iout Lile (2015)		
Course Website Additional Course Information		dle.hku.hk/ e will be offered subject	to a minimum enrollment n	umber and availability of teachers.			

BIOL3205	Human physiology (6 credits)	Academic Year	2017	
Offering Department	Biological Sciences	Quota	120	
Course Co-ordinator	Dr W Y Lui, Biological Sciences (wylui@hku.hk)			
Teachers Involved	(Dr C B Chan,Biological Sciences) (Dr W Y Lui,Biological Sciences) (Prof A O L Wong,Biological Sciences)			
Course Objectives	The course covers major aspects of the physiology of the human body us completing this course, students will have acquired fundamental principles interested in nutrition and human biology will find this course most useful.			
Course Contents & Topics	Overview of the physiological systems and homeostasis; Neural and hormonal communication; Nervous syste physiology; The digestive system; Cardiac physiology, the blood vessels and blood pressure; The respirator system; The urinary system; The skeletal & muscular system; Sensory mechanisms; Biological rhythms; Centroperipheral communication in energy homeostasis.			
Course Learning	On successful completion of this course, students should be able to:			

Outcomes	CLO 1 comprehend the essence of how the body meets changing conditions while maintaining a relatively constant internal environment						
	CLO 2 understand the functions of various body systems						
				tion of basic physiologic con	cepts		
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOC2600 or BIOL2103 or BIOL2220					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2	2019 : Y	E	xamination	Dec	
Grade Descriptors (A+ to F)	A	outcomes. Show strong ar	alytical and critical abilitie	vel of extensive knowledge require s and logical thinking, with evidenc infamiliar situations. Apply highly ef	e of original thou	ght, and ability to apply	
	В	Demonstrate substantial c	ommand of a broad rang of analytical and critical	e of knowledge required for attaini abilities and logical thinking, and a	ng at least most	of the course learning	
	С	Demonstrate general but in	ncomplete command of kn al and critical abilities and	owledge required for attaining mos logical thinking, and ability to app			
	Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organizational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ised course					
Course Teaching	Activities		Details			No. of Hours	
& Learning Activities	Lectures					36	
	Tutorials					12	
	Reading /	Self study				100	
Assessment Methods and Weighting	Methods		Details		ng in final grade (%)	Assessment Methods to CLO Mapping	
	Examinati	on		7	70	CLO 1,2,3	
	Test			3	30	CLO 1,2,3	
Required/recommended reading and online materials	Silverthorn D. U.: Human Physiology: An integrated Approach (Pearson, 2008) Sherwood L.: Human Physiology: From Cells to Systems (Thomson, 2007) Johnson M. D.: Human Biology (Pearson, 2006) Siegel G. J. et al.: Basic Neurochemistry (Academic Press, 2006) Mulroney S.E. & Myers A.K. Netter's Essential Physiology (Saunders, 2009)						
Course Website		dle.hku.hk/	•	·			
Additional Course Information	This cours	e will be offered subjec	ct to a minimum enrol	lment number and availabilit	y of teachers.		

BIOL3206	Clinica	al nutriti	on (6 credi	its)				Academic Yea	r 2017
Offering Department	Biologic	cal Science	es	•				Quota	70
Course Co-ordinator	Dr J M F	F Wan, Bio	ological Scie	nces (jmfw	an@hku.hk	)			
Teachers Involved	(Dr J M	1 F Wan,Bi	ological Scie	nces)					
Course Objectives	This co		to provide	understan	ding and in	sight into d	iseases assoc	iated with diet a	nd basic dietetics
	2. Desc obesity	cribe the r		n the deve	lopment an ease, cance	d prevention r, immune d	n of common of eficiency and r		such as diabetes
	4. Desc	cribe the ra	ationales for	postopera	tive nutrition	al support fo	or hospitalized	patients.	
Course Contents & Topics	preventi cardiova	The basics of nutrition for health and fitness and medical nutrition therapy. The role of diet in the development and prevention of chronic diseases such as cancer, diabetes, obesity and anorexia as well as bulimia nervosa, cardiovascular diseases, renal failure, etc. Malnutrition. Nutrition and immune function. Medical nutrition therapy for food allergy and food intolerance. Nutrition in pregnancy and lactation.							
Course Learning	On succ	cessful cor	mpletion of th	nis course,	students sh	ould be able	e to:		
Outcomes	CLO 1 discuss the different relationships between diet and disease								
	CLO 2 describe the role of diet in the development and prevention of diabetes, obesity and anorexia, cardiovascular disease, cancer, immune deficiency, and renal failure CLO 3 clearly differentiate and interpret risk factors that influence dietary choice CLO 4 describe the rationales for postoperative nutritional support for hospitalized patients								
							ort for nospitali	zed patients	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	n BIOL3202	or BIOL320	3 or BIOL	3204 or BIO	L3205			
Offer in 2017 - 2018	Y 2	2nd sem	Offer in 2018	3 - 2019 : \	1			Examination	May
Grade Descriptors (A+ to F)	A	learning of origin effective	outcomes. The nal thought, and organizational	orough grasp d ability to ap l and present	of the subject. oply knowledge ational skills.	Show strong a to a wide ran pply highly effe	nalytical and criticage of complex, far ective laboratory/fice	al abilities and logical miliar and unfamiliar s eldwork skills and tecl	ttaining all the course thinking, with evidence ituations. Apply highly nniques. Critical use o resentational skills.
	В	data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective laboratory /fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.							
	С	outcom thinking	es. General bu , and ability to a pply moderately	t incomplete apply knowle	grasp of the dge to most fa	subject. Show miliar situations	evidence of some s. Apply moderatel	e analytical and critic	of the course learning al abilities and logica anal and presentational aneous use of data and

	D	Demonstrate partial but limi Partial but limited grasp of t and logical thinking, but wit Apply limited or barely effe techniques. Limited ability organizational and presenta:	evidence of some coherent wledge to solve problems. lab / fieldwork skills and			
	Fail	or no grasp of the knowled thinking. Show very little or effective or ineffective. Appl	lge and understanding on ability to apply knowled the minimally effective or	owledge and skills required for attaining the cours of the subject. Lack of analytical and critical abil edge to solve problems. Organization and presen ineffective laboratory / fieldwork skills and techn s. Organization and presentational skills are minir	ities, logical and coherent tational skills are minimally iques. Misuse of data and	
Course Type	Lecture-ba	ised course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		20	CLO 1,2	
	Examinati	on		60	CLO 1,2,3,4	
	Presentat	on		20	CLO 1,2,3,4	
Required/recommended reading and online materials	S. Rodwel	Selected readings will also be available on the class website.  S. Rodwell Williams: Nutrition and Diet Therapy (7th ed.) Suitor & Hunter: Nutrition: Principles and Application in Health Promotion Wardlaw Gordon: Perspectives in Nutrition (2nd ed.)				
Course Website	http://moo	dle.hku.hk/	•			
Additional Course Information	This cours	e will be offered subject	to a minimum enro	llment number and availability of teache	rs.	

BIOL3207	Food a	nd nutritional tox	(icology (6 credits)	Academic `	<b>Year</b> 2017		
Offering Department		I Sciences	, , , , , , , , , , , , , , , , , , ,	Quota	80		
Course Co-ordinator	Dr H S E	I-Nezami, Biological	Sciences (elnezami@hku.hk)				
Teachers Involved		El-Nezami, Biological	, ,				
Course Objectives	confidence concepts exposure	To introduce students to methods used in assessing the toxicity of food contaminants, and to develop their confidence in the handling and interpretation of toxicological data. Students will also be introduced to the basic concepts behind toxicological evaluation, and the criteria for setting guidance values for dietary and nondietary exposure to chemicals. Students will understand the role of biochemical, metabolic and toxicokinetic studies in toxicological evaluation. This course aims to equip students with basic skills in conducting food toxicological					
Course Contents & Topics	concepts effects, the	Topics include a discussion on exposure and entry routes, fates of toxic substances in the body (toxicokinetics), concepts in experimental toxicology, the dose response relationship, actions of toxic substances, target organ effects, the actions and types of carcinogens. A survey of the health effects of common classes of toxic substances is also presented.					
Course Learning Outcomes	CLO 1 d	lemonstrate an und excretion of toxicants	, including an understanding o	e able to: involved in absorption, distribut f the toxicokinetic behavior of toxi s induced after exposure to toxica	cants in mammals		
	CLO 3 d	lemonstrate an unde oxicants	erstanding of the factors which	n underlie species differences in gate and solve toxicological prob	response to potentia		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	human health Pass in BIOC2600 or BIOL2220 or BIOL3205					
Offer in 2017 - 2018			8 - 2019 : Y	Examination			
Grade Descriptors (A+ to F)	<b>A</b>	Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.					
	В	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.					
	С	and logical thinking w data and results to d	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities ind logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of lata and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate noderately effective team-based organizational and presentational skills.				
	D						
	Fail	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherer and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually reroneous conclusions to real-world problems Demonstrate ineffectiveness team-based organizational and presentational skills.					
Course Type		with laboratory comp	onent course				
Course Teaching	Activitie		Details		No. of Hours		
Learning Activities	Lectures	3			24		
	Laborato				24		
	Tutorials	3			12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods		

	Assignments	seminars & continuous assessment	40	CLO 2,4	
	Examination		40	CLO 1,2,3	
	Laboratory reports		20	CLO 2	
Required/recommended reading and online materials	d S. S. Deshpande: Handbook of Fo	ood Toxicology (Marcel Dekker Ind	c., NY, 2002)		
Course Website	http://moodle.hku.hk/				
	This course will be offered subject to a minimum enrollment number and availability of teachers.				

anagement (6 credits)	Academic Yea	r 2017		
	Quota	45		
ces (ohabim@hku.hk)				
y management concepts used to introduce students to analysis and	,	•		
(ISO 9000) on of a Hazard Analysis Critical C / supply chain approach) nent systems (ISO 14000) in the food industry ood choices es on food safety management will	ood industry	ithin an ISO 22000		
course, students should be able to				
development of government regul				
nanagement techniques applicable	•			
production problems and make rec	•	nnrove quality and		
and make led	on action to the	inprove quality and		
	Examination			
sp of the subject matter covered. Show st				
v and competence in professional-level pri f data and results to draw appropriate and d organizational and presentational skills. grasp of the subject matter covered. Sho se of competence in professional-level prof esults to draw generally appropriate concoresentational skills. ncomplete grasp of the subject matter cov- nited competence in professional-level professional-level professional-level professions.	insightful conclusions to real-world pow evidence of analytical and criticolem solving. Use quality managementusions to real-world problems. Demored. Show some evidence of analyticolem solving. Use quality managements sometimes erroneous conclusions to	problems. Demonstrate al abilities and logical nt skills and techniques constrate effective team ical and critical abilities nt skills and techniques		
Demonstrate moderately effective team-based organizational and presentational skills.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.				
asp, with retention of little relevant information in minimal competence in professional-levidata and results ineffectively, leading genonstrate ineffectiveness team-based organi	ation, of the subject matter covered. el problem solving. Use quality merally to inappropriate and usually en	Show lack of coherent anagement skills and		
Details		No. of Hours		
		36		
including presentation		12		
<u> </u>		30		
		100		
Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	10	CLO 2		
	60	CLO 1,2,3		
including presentation	30	CLO 2,3		
n Press, 1992) ACCP: A Practical Approach (Cha r of Safe Food (2nd Ed., Wiley-Bla				
ct to a minimum enrollment numbe	r and availability of teachers.			
ct t	o a minimum enrollment numbe	to a minimum enrollment number and availability of teachers.		

BIOL3209	Food and nutrient analysis (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	70
Course Co-ordinator	Dr J C Y Lee, Biological Sciences (jettylee@hku.hk)		
Teachers Involved	(Dr J C Y Lee,Biological Sciences)		

		/ang,Biological Sciences				
Course Objectives	understan	To introduce basic principles and provide practical training in food and nutrient analysis. To help students to understand the principles behind analytical instruments used in food analysis. To train students to analyze major and minor food components as well as some food adulterants.				
Course Contents & Topics	technique adulterant	The key concepts in professional food analysis in an industry context will be introduced. Basic analytical techniques for macronutrients (e.g. protein, carbohydrate and fats), micronutrients (vitamins and minerals) and adulterants in food will be covered. A variety of classical and instrumental techniques used in food analysis will be discussed: rheology and texture measurement, thermal analysis, color, spectroscopy, chromatography and				
Course Learning		· · · · · · · · · · · · · · · · · · ·	course, students should be able to:			
Outcomes			ciples of food and nutrient analysis			
		•	of classical and instrumental analytic			
	CLO 4 be		behind analytical instruments associated and laboratory skills in no		e and analyze the	
			fy an appropriate analytical techniqu	e to solve practical food a	analysis problems	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	OL2101 or BIOL3201				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	019 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.					
	В	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.				
	С	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.				
	D					
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.					
Course Type	Lecture w	ith laboratory componen	•			
Course Teaching	Activities	3	Details	No. of Hours		
& Learning Activities	Lectures				24	
	Laborator	У			24	
	Tutorials	/ O = If = 4 d			6	
		Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	practical work & assignment	30	CLO 1,2,3,4,5	
	Examinat			70	CLO 1,2,3,4,5	
Required/recommended reading and online materials			ood Analysis: Theory and Practice ( Chemical Analysis of Foods (Jones		994, 3rd ed.)	
Course Website	http://moo	dle.hku.hk/				
Additional Course	This cours	se will be offered subject	t to a minimum enrollment number a	and availability of teachers	S	
Information						

BIOL3210	Grain production and utilization (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota	40			
Course Co-ordinator	Prof H Corke, Biological Sciences (harold@hku.hk)					
Teachers Involved						
Course Objectives	To provide a broad understanding of the utilization and significance of the major grains in the food industry and human health and nutrition.					
Course Contents & Topics	- Global grain production and consumption - The Green Revolution and its aftermath - International grain trade - Wheat: flour milling, dough rheology, the baking process, baking quality - Wheat: quality of Asian products including steamed bread and noodles - Wheat: small-scale tests for quality - Rice: nutritional quality, consumer preferences, milling, quality, quality testing, products - Maize: products of wet milling, animal feed development - Biofuels focusing on bioethanol - Illustrative business case studies on the grain processing industry will be discussed					
Course Learning Outcomes						
Pre-requisites (and Co-requisites	Pass in any level 2 BIOL course	mode and production				

and Impermissible combinations)						
Offer in 2017 - 2018	N Of	fer in 2018 - 2019	: N	Examination		
Grade Descriptors (A+ to F)	A	evidence of creative analysis of data and	gh grasp of the subject matter covered. She ability and competence in professional-led results to draw appropriate and insightful ational and presentational skills.	evel problem solving. Critically use lab sl	kills and techniques and	
	В	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.				
	С	and logical thinking data and results to	al but incomplete grasp of the subject matte with limited competence in professional-lev draw moderately appropriate but sometim t team-based organizational and presentatio	vel problem solving. Use lab skills and tennes erroneous conclusions to real-world	chniques and analysis of	
	D	evidence of cohere techniques and ana	but limited grasp, with retention of some nt and logical thinking, but lacking compe alysis of data and results to draw someti rate team-based organizational and present	etence in professional-level problem solumes appropriate but often erroneous co	ving. Use lab skills and	
	Fail	and logical thinking, data and results in	r no grasp, with retention of little relevant in and minimal competence in professional-le effectively, leading generally to inappropri tiveness team-based organizational and pre	evel problem solving. Use lab skills and te late and usually erroneous conclusions	chniques and analysis of	
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	tion		70	CLO 1,2,3,4,5	
	Project re	eports	including presentation	30	CLO 2,3	
Required/recommended reading and online materials	Elsevier,	edia of Grain Scie Oxford. (selected of dings to be provide		H, and Walker CE (2004) 3 Vol	umes, 1,700 pages.	
Course Website		odle.hku.hk/				
Additional Course Information	This cour	se will be offered s	subject to a minimum enrollment nu	umber and availability of teachers		

BIOL3211	Nutrige	nomics (6 credits)		Academic Yea	r 2017
Offering Department	Biologica	Sciences		Quota	40
Course Co-ordinator	Dr K C Ta	an-Un, Biological Science	s (kctanun@hku.hk)		
Teachers Involved	(Dr K C T	an-Un,Biological Science	es)		
Course Objectives	called Nu underpini	trigenomics. This course ning the science of nutriti	nding of the human genome have re aims to provide students with an un on and the relation between genes a nd the concepts of nutrigenomics an	derstanding of the bioche and diet-related diseases.	emical mechanisn
Course Contents & Topics	Regulation Overview Relevance Epigenetic predispose Polyunsa pathways	n of gene expression; Šin of lipid metabolism; chol e of folate, vitamin B12; cs, Barker s hypothesisition, candidate genes likturated fatty acid and the ;	enetics, metabolomics and nutritional ngle Nucleotide Polymorphisms and lesterol metabolic pathway; hyperlipic hyperhomocysteinemia and gene po s, influence of maternal nutrition in e leptin, FTO and other hormones in ir roles in the control of gene expres context of genetic mutations and per	relation to diseases.  laemia, LDL receptor mut  lymorphisms in diseases.  fetal gene expression.  volved in the control of ap  sion example lipogenesis	Obesity, geneti
Course Learning			ourse, students should be able to:	. ,	
Outcomes	CLO 1 e	xplain the principles of the	e control of gene expression		
	CLO 2 demonstrate understanding of the role of metabolic pathways in relationship to diet, gene expression and disease  CLO 3 discuss how genetic variations are used to study the role of genes in nutrient-related cellular processes  CLO 4 explain the relationship between genotype, epigenetics and diet-related diseases  CLO 5 critically evaluate current theories of personalized nutrition based on individual genetic variation				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IOC2600 or BIOL2220			
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	19 : Y	Examination	Dec
Grade Descriptors (A+ to F)	В	skills. Show excellent abilit Demonstrate highly effective Demonstrate substantial gra	of the subject matter covered. Show extensi- y to critically analyze and interpret comple- organization and writing skills. Issp of the subject matter covered. Show sub- ntial ability to critically analyze and interpre- ization and writing skills.	x scientific data and draw ap estantial ability of knowledge in	propriate conclusions
	С	Demonstrate general and acceptable grasp of the subject matter covered. Show acceptable ability of knowledge integration and problem solving skills. Show moderate ability to analyze and interpret scientific data and draw proper conclusions. Demonstrate moderate organization and writing skills.			
	D	skills. Show limited ability to	of the subject matter covered. Show limited analyse and interpret scientific data. Demonst	rate basic organization and writ	ing skills.
	Fail	thinking, and minimal evide	<ul> <li>p, with little retention of information of the subnce in problem solving. Fail to integrate infoet scientific data and draw conclusions. Demo</li> </ul>	rmation and identify problems.	Show little or minima
Course Type	Lecture-b	ased course			-
Course Teaching	Activitie	s	Details		No. of Hours
& Learning Activities	Lectures				36

	Tutorials	student-centered learn	ning	12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Details Weighting in final course grade (%)	
	Assignments		20	CLO 1,2,3,4,5
	Examination		60	CLO 1,2,3,4,5
	Test		20	CLO 1
Required/recommended reading and online materials	Lehninger Principles of Bioch Ordovas: Nutrigenetics and N Brigelius-Flohe, Joost: Nutriti Rimbach, Fuchs, Packer: Nu Journals in Nutrition, Molecul	Nutrigenomics. Wiley. 2004 ional Genomics. Wiley. 2006. trigenomics, CRC Press. 200		
Course Website	http://moodle.hku.hk/			
Additional Course Information	This course will be offered su	ubject to a minimum enrollme	ent number and availability of teachers	S.

BIOL3215	Principle	es of dietary as	sessment (6 credits)	Academic Ye	ar 2017	
Offering Department	Biological	Sciences		Quota	30	
Course Co-ordinator	Dr J C Y L	ouie, Biological So	ciences (jimmyl@hku.hk)			
Teachers Involved		Louie,Biological S	,			
Course Objectives		ssess these meas	arious methods used to measure die surements against international stan			
Course Contents & Topics	Topics co- use of foo monitoring	vered will include to composition da	the validity and reliability of different ratabases, nutrition screening tools are Students will conduct project work an ols.	nd the planning and use of	national surveys for	
Course Learning	On succes	ssful completion of	this course, students should be able	to:		
Outcomes	CLO 1 un	derstand the princ	ciples of dietary assessment methods,	, and the strengths of limitatio	ns of these methods	
	CLO 2 ev	aluate the validity	and reliability of dietary assessment t	ools		
			propriate nutrition assessment method			
	CLO 4 ex	plain the meaning	and uses of Dietary Reference Intake	es		
	ind	dividual dietary inta				
			diets in terms of nutritional quality for improvement, in both product deve			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI					
Offer in 2017 - 2018			18 - 2019 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use practical skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.					
	В	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use practical skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.				
	С					
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use practical skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.				
	Fail	Demonstrate little or and logical thinking, analysis of data and	no grasp, with retention of little relevant inform and minimal competence in professional-lev- d results ineffectively, leading generally to ina te ineffectiveness team-based organizational	mation, of the subject matter covered el problem solving. Use practical si appropriate and usually erroneous d	kills and techniques and	
Course Type	Laborator	y and workshop co	ourse			
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Workshop	os			48	
	Tutorials				12	
	Reading /	Self study			90	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Laborator	y reports		40	CLO 1,3,4,5	
	Presentat		Group presentation	10	CLO 1,3,4,5,6	
	Project re	ports		30	CLO 1,3,4,5,6	
	Test			20	CLO 1,2,3,4,5,6	
Required/recommended reading and online materials	Gibson RS Online ma Institute o	nd Nieman DC, Nu S, Principles of Nu Iterials: If Medicine (US) F	utritional Assessment 6th Ed. McGraw tritional Assessment 2nd Ed. Oxford l Food and Nutrition Board. Dietary Re evels for Nutrients. http://www.ncbi.nlr	Jniversity Press eference Intakes: A Risk As	sessment Model fo	
Course Website		dle.hku.hk				
	p.//11100		ubject to a minimum enrollment numb			

	. 004 110	aste management	t (6 credits)	Academic Ye	ar 2017	
Offering Department	Biological	Sciences		Quota	30	
Course Co-ordinator			ences (ohabim@hku.hk)			
Teachers Involved		oimana,School of Biol				
Course Objectives	within the	farm to table chair	an understanding of the propagation. To allow students to critically entering in comparison to other countries	valuate food waste manage		
Course Contents & Topics	With our increase to fall food per year! In this could by preser types. Ba Kong confootprint. Course ouFacts and -Basic Wa	current global populoy 70% to meet food I produced for humar Clearly we should be urse, the social, ecorniting relevant facts as sic waste management pared to other course will address the course will be course the course the course will be course the course the course will be course will be course will be course will be course the course will be c	ation estimated to reach 9.1 billiodemand. However, our current worn of consumption lost or wasted. This worried about food wastage, nomic, and environmental implication figures and case studies emborent concepts will also be covered, ntries in Asia, while providing the ess current applications and limitational & Environmental implications of food Wastencepts (3 R's)	on in 2050, food production and food supply is instead declarmounts to a staggering 1 to cons associated with food was dying agricultural, industrial a examining current waste made basis for examining our of the cons of food waste treatment to	ining, with 1/4 to 1/ 2 billion metric ton ste will be identified and consumer wast anagement in Hon- wn personal waste	
	-Case stu -Case stu -Waste M	dies: Food Industrial dies: Food consumer anagement in Hong I	waste	Kona		
		•	tions & limitations in food waste tre	•		
Course Learning Outcomes	CLO 1 ur fo CLO 2 be	nderstand and define otprint. e able to define the 3	is course, students should be able the various types of waste as w R's in waste management (reduce	ell as create an awareness e, reuse, recycle), and be fam		
	polices in Hong Kong compared to other countries in Asia /Worldwide.  CLO 3 be able to describe current and novel technologies for treating waste, as well as transforming waste into value added resources.					
	CLO 4 to develop written and oral presentation skills necessary to effectively convey technical, economic, and social information related to waste management.					
Pre-requisites	Pass in B	IOL2101 or BIOL320	1			
and Co-requisites and Impermissible			•			
and Co-requisites and Impermissible combinations)		d sem Offer in 2018		Examination	May	
and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Y 2nd	d sem Offer in 2018 Demonstrate thorough gevidence of creative ab techniques and analysis highly effective team-ba	rasp of the subject matter covered. Show slitly and competence in professional-level ps of data and results to draw appropriate an sed organizational and presentational skills.	strong analytical and critical abilities problem solving. Critically use quality d insightful conclusions to real-world	and logical thinking, wit management skills and problems. Demonstrate	
and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd	Demonstrate thorough gevidence of creative ab techniques and analysis highly effective team-ba Demonstrate substantia thinking with some evide and analysis of data an based organizational an	grasp of the subject matter covered. Show stillity and competence in professional-level ps of data and results to draw appropriate an sed organizational and presentational skills. all grasp of the subject matter covered. Sience of competence in professional-level professional to draw generally appropriate cond presentational skills.	strong analytical and critical abilities problem solving. Critically use quality d insightful conclusions to real-world now evidence of analytical and crit ablem solving. Use quality managem clusions to real-world problems. Der	and logical thinking, wit management skills and d problems. Demonstrat- ical abilities and logica tent skills and technique monstrate effective tear	
and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd A B	Demonstrate thorough gevidence of creative ab techniques and analysis highly effective team-ba Demonstrate substantia thinking with some evide and analysis of data an Demonstrate general bu and logical thinking with and analysis of data an Demonstrate moderately	grasp of the subject matter covered. Show stallity and competence in professional-level ps of data and results to draw appropriate an second organizational and presentational skills. If grasp of the subject matter covered. Stence of competence in professional-level professional-level professional depresentational skills. It incomplete grasp of the subject matter collimited competence in professional-level pro	strong analytical and critical abilities problem solving. Critically use quality d insightful conclusions to real-world now evidence of analytical and crit ablem solving. Use quality managem clusions to real-world problems. Der wered. Show some evidence of analy boblem solving. Use quality managem ut sometimes erroneous conclusions resentational skills.	and logical thinking, wit management skills and problems. Demonstrat ical abilities and logica lent skills and technique monstrate effective tear ytical and critical abilitie lent skills and technique s to real-world problems	
and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd	Demonstrate thorough gevidence of creative ab techniques and analysis highly effective team-based organizational an Demonstrate general bu and logical thinking with some evide and analysis of data an Demonstrate general bu and logical thinking with and analysis of data an Demonstrate moderate! Demonstrate partial but evidence of coherent management skills and	grasp of the subject matter covered. Show so grasp of the subject matter covered. Show so data and results to draw appropriate an sed organizational and presentational skills. If grasp of the subject matter covered. Stence of competence in professional-level profusion of the subject matter conditional skills. It incomplete grasp of the subject matter collimited competence in professional-level profusion of the subject matter collimited competence in professional-level profusion of the subject matter collimited competence in professional-level profusion of the subject matter collimited competence in professional-level profusion of the subject matter collimited competence in professional-level profusion of the subject matter collimited competence in professional-level profusion of the subject matter collimited competence in professional-level profusion of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited competence in professional development of the subject matter collimited collimited collimited collimited collimited collimited collimited coll	strong analytical and critical abilities problem solving. Critically use quality dinsightful conclusions to real-world mow evidence of analytical and critically use quality managem clusions to real-world problems. Derivered. Show some evidence of analytical most of the solving. Use quality managem ut sometimes erroneous conclusions resentational skills. Vant information, of the subject mattence in professional-level problems uts to draw sometimes appropria	and logical thinking, wit y management skills and d problems. Demonstrat ical abilities and logica lent skills and technique monstrate effective tear ytical and critical abilitie lent skills and technique s to real-world problems ler covered. Show som m solving. Use quality ate but often erroneous	
and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018  Grade Descriptors (A+ to F)	Y 2nd A B C D	Demonstrate thorough gevidence of creative ab techniques and analysis highly effective team-ba Demonstrate substantia thinking with some evide and analysis of data an based organizational an Demonstrate general bu and logical thinking with and analysis of data an Demonstrate moderately Demonstrate partial but evidence of coherent management skills and conclusions to real-world Demonstrate little or no and logical thinking, a techniques and analysis real-world problems. De	grasp of the subject matter covered. Show stallity and competence in professional-level ps of data and results to draw appropriate an sed organizational and presentational skills. If grasp of the subject matter covered. Stance of competence in professional-level professional-level professional for presentational skills. It incomplete grasp of the subject matter collimited competence in professional-level prof	strong analytical and critical abilities irroblem solving. Critically use quality dinsightful conclusions to real-world mow evidence of analytical and critically use solving. Use quality managem clusions to real-world problems. Derivered. Show some evidence of analytical most inclusions to real-world problems. Derivered. Show some evidence of analytical solving. Use quality managem us sometimes erroneous conclusions resentational skills. Vant information, of the subject mattence in professional-level problem sultis to draw sometimes appropriatizational and presentational skills of nation, of the subject matter covered vel problem solving. Use quality innerally to inappropriate and usually enerally to inappropriate and usually energing the problem solving.	and logical thinking, wit management skills and diproblems. Demonstratical abilities and logical thinking and technique monstrate effective tear skills and technique and critical abilities to real-world problems for covered. Show some solving. Use quality at but often erroneous limited effectiveness. d. Show lack of coherer management skills and	
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and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018  Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities	Y 2nd A B C D Fail Lecture-b Activities Lectures Tutorials Group wo Reading	Demonstrate thorough gevidence of creative ab techniques and analysis highly effective team-ba Demonstrate substantit thinking with some evide and analysis of data an based organizational an Demonstrate general bu and logical thinking with and analysis of data an Demonstrate moderately Demonstrate partial but evidence of coherent management skills and conclusions to real-world Demonstrate little or no and logical thinking, at techniques and analysis real-world problems. De ased course	grasp of the subject matter covered. Show stallity and competence in professional-level ps of data and results to draw appropriate an sed organizational and presentational skills. If grasp of the subject matter covered. Stence of competence in professional-level professional-level professional development of presentational skills. It incomplete grasp of the subject matter colimited competence in professional-level professional-level professional development of results to draw moderately appropriate by effective team-based organizational and professional-level professional-leve	strong analytical and critical abilities irroblem solving. Critically use quality dinsightful conclusions to real-world insightful conclusions to real-world problem solving. Use quality managem clusions to real-world problems. Der wered. Show some evidence of analyblem solving. Use quality managem ut sometimes erroneous conclusions resentational skills. Vant information, of the subject mattence in professional-level problem sults to draw sometimes approprializational and presentational skills of mation, of the subject matter covered problem solving. Use quality interally to inappropriate and usually enizational and presentational skills.  Weighting in final	and logical thinking, wit management skills and problems. Demonstrated problems. Demonstrate ical abilities and logical ent skills and technique monstrate effective tear sylical and critical abilities to real-world problems for covered. Show some solving. Use quality at but often erroneous limited effectiveness. d. Show lack of coherer management skills and erroneous conclusions to the solving. Use quality and solving. Use quality at but often erroneous limited effectiveness. d. Show lack of coherer management skills and erroneous conclusions to the solving. Assessment Methods	
and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd A B C D Fail Lecture-b Activities Lectures Tutorials Group wo Reading Methods	Demonstrate thorough gevidence of creative ab techniques and analysis highly effective team-ba Demonstrate substantia thinking with some evide and analysis of data an based organizational an Demonstrate general bu and logical thinking with and analysis of data an Demonstrate partial but evidence of coherent management skills and conclusions to real-work Demonstrate little or no and logical thinking, a techniques and analysis real-world problems. De ased course	grasp of the subject matter covered. Show stallity and competence in professional-level ps of data and results to draw appropriate an sed organizational and presentational skills. If grasp of the subject matter covered. Stence of competence in professional-level professional-level professional development of presentational skills. It incomplete grasp of the subject matter colimited competence in professional-level professional-level professional development of results to draw moderately appropriate by effective team-based organizational and professional-level professional-leve	strong analytical and critical abilities problem solving. Critically use quality dinsightful conclusions to real-world mow evidence of analytical and critically use solving. Use quality managem clusions to real-world problems. Der vered. Show some evidence of analytoblem solving. Use quality managem ut sometimes erroneous conclusions resentational skills. It want information, of the subject mattence in professional-level problem sults to draw sometimes appropria izational and presentational skills of nation, of the subject matter covered problem solving. Use quality inerally to inappropriate and usually enizational and presentational skills.  Weighting in final course grade (%)	and logical thinking, wit management skills and problems. Demonstratical abilities and logical ent skills and technique monstrate effective tear ytical and critical abilities and technique is to real-world problems are covered. Show some solving. Use quality ate but often erroneous limited effectiveness. It is shown to show the shown and the shown and the shown are covered. Show some solving. Use quality ate but often erroneous limited effectiveness. It is shown as the shown and the shown are conclusions to the shown and the sho	
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BIOL3217	Food, environment and health (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	50
Course Co-ordinator	Dr T. Sobko, Biological Sciences (tsobko@hku.hk)		
Teachers Involved	(Dr T Sobko, School of Biological Sciences)		
Course Objectives	A cross-disciplinary exploration of the environmental, socio-economic, public he	alth and personal	nutrition contexts

	our diet. food resou	Γο examine the interact urces (growth, production	w our food choices influence the environs among environment (e.g. pollutions), consumption, processing, distribution	n, soil and water quality n and disposal) and heal	, climate change) th.
Course Contents & Topics  Course Learning Outcomes	consumpt becoming consumpt can impro can improve c	ion. Are we destroying increasingly toxic for increasingly toxic for ion on the environment to the these interactions, will be used with emphapics will include impact of calories, rise of meat fertilizers' use. We will are influenced by the ental and food-related the sociocultural, sociod the importance of biol dividual, environment are saful completion of this conduction address today's nation of understand multifactor of address today's nation of understand historical application of the right to blicies and other interversion demonstrate skills to be	course, students should be able to: rial and interdisciplinary relations in sust hal and global challenges in the environ and current aspects (agricultural produce food/environment issues including adequate food; strengths and weakn	In growing populations? If three blocks: 1) The dand human health, an ples. A Problem Based an nutrition, well-being as on food systems (e.g. uxury foods) and the detics, affect human health will help the students to and private. Students to and private. Students will aspects of food and dhigh quality food being trainable environment and mental and food sectors ction, policy initiatives) Ic food production, consulesses of political, social possible to communicate the i	s the environmen influence of food d 3) What actions d Learning (PBL) and environmenta demand for cheap pletion of soil and nad how sensory navigate complex all learn to critically environment and a just model for a d nutrition coally, in Asia and mption, and the all, and economic ssues of food and
		tervention in public setti	,	ianowiougo wimo ucoigii	mig an applicable
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IOL 2101 or BIOL3201			
Offer in 2017 - 2018		sem Offer in 2018 - 2	019 : Y sp of the subject matter covered. Show strong ar	Examination	Dec
Grade Descriptors (A+ to F)  Course Type	B C D Fail	evidence of creative ability techniques and analysis of highly effective team-based Demonstrate substantial githinking with some evidence and analysis of data and rebased organizational and pictorial period programment of the programment of	and competence in professional-level problems data and results to draw appropriate and insight I organizational and presentational skills.  areasp of the subject matter covered. Show evice of competence in professional-level problem scesults to draw generally appropriate conclusions	solving. Critically use quality n ful conclusions to real-world p lence of analytical and criticaliving. Use quality managemen to real-world problems. Demothow some evidence of analyticitying. Use quality managemen imes erroneous conclusions to onal skills.  Tradion, of the subject matter professional-level problem draw sometimes appropriate and presentational skills of lim f the subject matter covered. Solem solving. Use quality map inappropriate and usually erronapropriate and usually erronapropriat	nanagement skills and roblems. Demonstrate all abilities and logical takills and techniques onstrate effective team call and critical abilities to takills and techniques or real-world problems.  covered. Show some solving. Use quality but often erroneous ited effectiveness. Show lack of coherent inagement skills and
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures	-	with practicals		36
	Tutorials				12
	Project w				20
	Reading	/ Self study			50
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme		Final group presenation (30%), Critical reviews of other student's final project presentations (10%)	40	CLO 1,2,3,4,5
Di	Examinat		A of the property and the St.	60	CLO 1,2,3
Required/recommended reading and online materials			t of the reading material will be provided	a on Moodle or distribute	a during lectures.
Course Website	Links	dle.hku.hk			

BIOL3218	Food hygiene and quality control (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	30
Course Co-ordinator	Dr O Habimana, Biological Sciences (ohabim@hku.hk)		
Teachers Involved	(Dr L Zhang, School of Biological Sciences) (Dr O Habimana, School of Biological Sciences)		
Course Objectives	To provide exposure to some key management, microbiology and food proces high-quality food products. To introduce students to analysis and problem-solv food safety management.		
Course Contents & Topics	<ul> <li>The regulatory, social and business imperative for food safety.</li> <li>Basic concepts in TQM</li> <li>Statistical Process Control</li> <li>Quality Function Deployment</li> </ul>		

	- Quality	/ management standards (	ISO 9000)		
			n of a Hazard Analysis Critical Co	ontrol Point (HACCP) plan (	within an ISO 22000
		ety management system/	•	, , , , , , , , , , , , , , , , , , ,	
			ent systems (ISO 14000) in the fo	od industry	
	- A revie	ew of microbiology in a foo	d safety context	•	
		ous, ethical, and cultural fo			
			on food safety management will		
Course Learning			ourse, students should be able to		
Outcomes			obiological and food processing co		
			anagement techniques applicable		
		be able to analyze food pr safety	oduction problems and make reco	ommendations for action to	improve quality and
Pre-requisites	Pass in	BIOL2101 or BIOL3201 or	BIOL3203		
and Co-requisites and Impermissible combinations)	Not for	student who have passed i	n BIOL3208		
Offer in 2017 - 2018	Y 1	st sem Offer in 2018 - 20	)19 : Y	Examination	Dec
Grade Descriptors (A+ to F)	Α	evidence of creative ability a techniques and analysis of o	o of the subject matter covered. Show stro and competence in professional-level pro- data and results to draw appropriate and i organizational and presentational skills.	blem solving. Critically use quality	y management skills and
	B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective teambased organizational and presentational skills.				
	С				
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneou conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.			
	Fail	Demonstrate little or no gras and logical thinking, and r techniques and analysis of c	sp, with retention of little relevant informationimal competence in professional-level data and results ineffectively, leading gene	tion, of the subject matter covere of problem solving. Use quality erally to inappropriate and usually	<ul> <li>d. Show lack of coherent management skills and</li> </ul>
Course Type	Locturo	-based course	strate ineffectiveness team-based organiz	ational and presentational skills.	
Course Teaching	Activit		Details		No. of Hours
Learning Activities	Lecture		Details		36
	Group				12
	Project				30
		g / Self study			100
Assessment Methods	Method	•	Details	Weighting in final	Assessment
and Weighting	Wethor	15	Details	course grade (%)	Methods to CLO Mapping
	Assigni	ments		20	CLO 2
	Examin			50	CLO 1,2,3
	Project	reports		30	CLO 2,3
Course Website	http://m	oodle.hku.hk			
Additional Course			to a minimum enrollment number	and availability of teachers	i.
nformation		alternate year from 2017-2		•	

BIOL3301	Marine biology (6	credits)		Academic Year	2017
Offering Department	Biological Sciences	·		Quota	40
Course Co-ordinator	Dr M Yasuhara, Biolo	gical Sciences (yasuha	ra@hku.hk)		
Teachers Involved	(Dr B Russell,Biologi (Dr M Yasuhara,Biologi (Dr S Cannicii,Biologi	ogical Sciences)			
Course Objectives	of marine life, their fu	inction, ecology and inte al resources and threa	eciation of the field of marine biologer-relationships. Contemporary issues to their long-term sustainability	ues including the b	enefits we derive
Course Contents & Topics	temperature, pH, dis 2. Important groups and marine food web 3. Major marine habi 4. Exploitation of ma	solved oxygen, nutrients of marine organisms (e ats and ecosystems (e. rine biological resources	nts (e.g., light, current, atmosphe) and how these may affect the mae.g., phytoplankton, zooplankton, bg., intertidal, benthic, pelagic, deep (e.g., fisheries and bioactive compe, marine pollution, sustainable use	rine biota penthos, nekton, n sea, coral reefs, n pounds)	narine mammals)
Course Learning Outcomes	CLO 1 demonstrate CLO 2 recognize the CLO 3 appreciate the	a basic understanding of interactions of marine	dents should be able to: of the diversity and function of marin biota and their environments e ecosystems and the threats of h utions		n their long-term
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2306 or	•			
Offer in 2017 - 2018	Y 1st sem Offe	er in 2018 - 2019 : Y		Examination	Dec
Grade Descriptors			dvanced level of extensive knowledge and all and critical abilities and logical thinking, v		

(A+ to F)		to apply knowledge to a wipresentational skills.	ide range of complex, fam	iliar and unfamiliar situations. Apply highly effe	ective organizational and	
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Show evidence of some coh	nerent and logical thinking, b	e and skills required for attaining some of the co out with limited analytical and critical abilities. Sh ective organizational and presentational skills.		
	Fail	of analytical and critical ab	pilities, logical and coherer	edge and skills required for attaining the course it thinking. Show very little or no ability to ap nimally effective or ineffective.		
Course Type	Lecture wi	th laboratory componen	t course			
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures			24		
	Field work		field trip, laboratory practical & tutorials		30	
	Reading / Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		20	CLO 1,2,3	
	Examinati	on		80	CLO 1,2,3	
Required/recommended reading and online materials	Nybakken, Cummings H. V. Thur	J.W. and Bertness, i s. man and E. A. Burton: li	M.D., 2004. Marine Entroductory Oceanogra	ty, ecology 2nd edition. 515 pp. Oxford Biology: An Ecological Approach, 6th aphy (Prentice Hall, 2001, 9th ed.) enjamin Cummings, 2000)		
Course Website	http://www	.biosch.hku.hk/ecology/	'lsc/			

BIOL3302	Systema	atics and phylogene	etics (6 credits)	Academic Year	2017
Offering Department	Biological	Sciences	•	Quota	60
Course Co-ordinator	Prof R M	K Saunders, Biological S	Sciences (saunders@hku.hk)		
Teachers Involved	(Prof R M	K Saunders, Biological S	Sciences)		
Course Objectives	current tre anatomy,	ends and controversies. ecology, population bio	ing of the principles of systemat Systematics forms an invaluable plogy and evolutionary biology), a ochemistry, chemistry, molecular	e grounding for many fields of and enables the integration of	biology (including of a wide range o
Course Contents & Topics	Currrent of (evolution biochemis environme	classificatory theories: phary reconstruction). The stry, chemistry, moleculental factors; hybridizational factors; hybridization process.	nenetic systematics (classifications ne species concept. Sources of ular biology, cytology, and et on; breeding systems. Principles occedures and problems; students	s based on overall resemblan f taxonomic data: morphol hology. Causes of taxonor of nomenclature. Laborator	ces) and cladistic ogy & anatomy, nies complexity: y sessions will be
Course Learning	On succe	ssful completion of this c	course, students should be able to	):	
Outcomes		xplain taxon concepts (wan be applied below the s	rith particular reference to species species level	) and show how multivariate s	statistical methods
	si	ster-group relationships,	ehind maximum parsimony meth out-group comparison, homoplas	y and the assessment of clad	e stability)
		,	ources of taxonomic data, and exp		c data sources
		•	s of taxonomic complexity, and ide		c
	CLO 5 understand the principles of nomenclature in order to interpret the previous application of scientific names				
	ar	re validly publish new na	imes		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	re validly publish new nai IOL1309; and 2 BIOL course	mes		
(and Co-requisites and Impermissible combinations)	Pass in B Any level	IOL1309; and		Examination	Dec
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018	Pass in B Any level	IOL1309; and 2 BIOL course sem Offer in 2018 - 20 Demonstrate thorough mas learning outcomes, with evi critical abilities and logical to		knowledge required for attaining mo and use of named examples. Show on skills. Demonstrate effective use	st or all of the course evidence of significant of data and results to
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in B Any level	IOL1309; and 2 BIOL course  Sem Offer in 2018 - 20  Demonstrate thorough mas learning outcomes, with evicitical abilities and logical the draw appropriate and insight evidence and techniques.  Demonstrate substantial consome background reading a presentation skills. Demonstrate substantial consome background reading a presentation skills.	019: Y stery at an advanced level of extensive k idence of extensive background reading a thinking. Apply highly effective presentatic htful conclusions. Show evidence of integ ommand of knowledge required for attainin and use of named examples. Show evide strate use of data and results to draw a	knowledge required for attaining mo and use of named examples. Show on skills. Demonstrate effective use gration of a wide range of appropria ng most of the course learning outco ence of critical abilities and logical th appropriate and insightful conclusion	st or all of the course evidence of significan of data and results to te theories, principles omes, with evidence of inking. Apply effective
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in B Any level Y 1st	IOL1309; and 2 BIOL course  Sem Offer in 2018 - 20 Demonstrate thorough mas learning outcomes, with evicritical abilities and logical through draw appropriate and insigile evidence and techniques. Demonstrate substantial consome background reading presentation skills. Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod	019: Y stery at an advanced level of extensive k idence of extensive background reading a thinking. Apply highly effective presentati htful conclusions. Show evidence of integ mmand of knowledge required for attainir and use of named examples. Show evide	knowledge required for attaining mo and use of named examples. Show on skills. Demonstrate effective use gration of a wide range of appropriating most of the course learning outcome of critical abilities and logical the appropriate and insightful conclusion exhiques. Skills required for attaining most of med examples. Show evidence of so nonstrate mostly correct use of data	st or all of the course evidence of significant of data and results to the theories, principles, with evidence or inking. Apply effective ins. Show evidence of the course learning me critical abilities and a and results to draws
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in B Any level  Y 1st A	IOL1309; and 2 BIOL course  Sem Offer in 2018 - 20  Demonstrate thorough mas learning outcomes, with evicritical abilities and logical through draw appropriate and insight evidence and techniques.  Demonstrate substantial consome background reading a presentation skills. Demons general integration of appropose appropriate and insightful citechniques.  Demonstrate partial but limit with insufficient evidence of logical thinking. Apply mod appropriate and insightful citechniques.  Demonstrate partial but limit with insufficient evidence of logical thinking. Apply limite insightful conclusions. Show	one of extensive katches and advanced level of extensive katches of extensive background reading a thinking. Apply highly effective presentative htful conclusions. Show evidence of integrammand of knowledge required for attaining and use of named examples. Show evidestrate use of data and results to draw a priate theories, principles, evidence and tencomplete command of knowledge and limited background reading and use of nate derately effective presentation skills. Demonclusions. Show evidence of partial intitled command of knowledge and skills red background reading and use of named ed presentation skills. Demonstrate limite vevidence of limited integration of appropriate integration of	knowledge required for attaining mo and use of named examples. Show on skills. Demonstrate effective use gration of a wide range of appropriating most of the course learning outcomer. On the control of the course learning outcomer. On the control of the control of the control of the control of the course learning most of the course learning some of the course learning some of the course learning learning some of the course learning learning some of the course learning some of the course learning some of the course learning learning some of the course learn	st or all of the course evidence of significan of data and results to the theories, principles, with evidence of inking. Apply effective is. Show evidence of the course learning me critical abilities and a and results to drawnciples, evidence and se learning outcomes dirtical abilities and draw appropriate and techniques.
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in B Any level  Y 1st  A  B	IOL1309; and 2 BIOL course  Sem Offer in 2018 - 20  Demonstrate thorough mas learning outcomes, with evicitical abilities and logical the draw appropriate and insight evidence and techniques.  Demonstrate substantial consome background reading a presentation skills. Demons general integration of appropies and insightful coutcomes, with evidence of logical thinking. Apply mod appropriate and insightful citechniques.  Demonstrate partial but limi with insufficient evidence of logical thinking. Apply limite insightful conclusions. Show Demonstrate little or no evice no evidence of background Presentational skills are min	one of background reading and use of named end presentation. Show evidence and thinking. Apply highly effective presentation of the conclusions. Show evidence of integrand use of named examples. Show evidence and the complete command of knowledge required for attaining and use of named examples. Show evidestrate use of data and results to draw a priate theories, principles, evidence and the complete command of knowledge and limited background reading and use of naterately effective presentation skills. Dem conclusions. Show evidence of partial in the decommand of knowledge and skills refer to background reading and use of named ed presentation skills. Demonstrate limite	knowledge required for attaining mo and use of named examples. Show on skills. Demonstrate effective use gration of a wide range of appropriating most of the course learning outcome of critical abilities and logical that appropriate and insightful conclusion exhiques. Show evidence of so nonstrate mostly correct use of data egration of appropriate theories, priquired for attaining some of the courle examples. Show evidence of limite da ability to use data and results to iate theories, principles, evidence and is required for attaining the course le vittle or no evidence of critical abilities and results to draw appropriate to a training the course le vittle or no evidence of critical abilities and results to draw appropriate to a training the course le vittle or no evidence of critical abilities.	st or all of the course evidence of significan of data and results to the theories, principles area, with evidence or inking. Apply effective is. Show evidence of the course learning me critical abilities and a and results to drawnciples, evidence and see learning outcomes and techniques. The course is the critical abilities and draw appropriate and techniques. The course is th
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Pass in B Any level  Y 1st A  B  C	IOL1309; and 2 BIOL course  Sem Offer in 2018 - 20  Demonstrate thorough mas learning outcomes, with evicitical abilities and logical the draw appropriate and insight evidence and techniques.  Demonstrate substantial consome background reading a presentation skills. Demons general integration of appropies and insightful coutcomes, with evidence of logical thinking. Apply mod appropriate and insightful citechniques.  Demonstrate partial but limi with insufficient evidence of logical thinking. Apply limite insightful conclusions. Show Demonstrate little or no evice no evidence of background Presentational skills are min	one of command of knowledge and skills red depresentation skills. Demonstrate limited command of knowledge required for attaining a price theorem of the command of knowledge required for attaining and use of named examples. Show evidestrate use of data and results to draw a priate theories, principles, evidence and tencomplete command of knowledge and limited background reading and use of national derately effective presentation skills. Demonclusions. Show evidence of partial intrict decommand of knowledge and skills red for background reading and use of named expresentation skills. Demonstrate limite vevidence of limited integration of appropridence of command of knowledge and skill reading or use of named examples. Show inimally effective or ineffective. Misuse of depropriate theories, principles, evidence and spirinciples, evidence and propriate theories, principles, evidence and propriate theories.	knowledge required for attaining mo and use of named examples. Show on skills. Demonstrate effective use gration of a wide range of appropriating most of the course learning outcome of critical abilities and logical that appropriate and insightful conclusion exhiques. Show evidence of so nonstrate mostly correct use of data egration of appropriate theories, priquired for attaining some of the courle examples. Show evidence of limite da ability to use data and results to iate theories, principles, evidence and is required for attaining the course le vittle or no evidence of critical abilities and results to draw appropriate to a training the course le vittle or no evidence of critical abilities and results to draw appropriate to a training the course le vittle or no evidence of critical abilities.	st or all of the course evidence of significan of data and results to the theories, principles area, with evidence or inking. Apply effective is. Show evidence of the course learning me critical abilities and a and results to drawnciples, evidence and see learning outcomes and techniques. The course is the critical abilities and draw appropriate and techniques. The course is th
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in B Any level  Y 1st A  B  C	IOL1309; and 2 BIOL course  Sem Offer in 2018 - 20 Demonstrate thorough mas learning outcomes, with evicritical abilities and logical through mas learning outcomes, with evicritical abilities and logical through mass presentation skills. Demonstrate substantial consome background reading a presentation skills. Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful catechniques.  Demonstrate partial but liming with insufficient evidence of logical thinking. Apply limite insightful conclusions. Show Demonstrate little or no evicence of background Presentational skills are minevidence of integration of aprith laboratory componen	one of command of knowledge and skills red depresentation skills. Demonstrate limited command of knowledge required for attaining a price theorem of the command of knowledge required for attaining and use of named examples. Show evidestrate use of data and results to draw a priate theories, principles, evidence and tencomplete command of knowledge and limited background reading and use of national derately effective presentation skills. Demonclusions. Show evidence of partial intrict decommand of knowledge and skills red for background reading and use of named expresentation skills. Demonstrate limite vevidence of limited integration of appropridence of command of knowledge and skill reading or use of named examples. Show inimally effective or ineffective. Misuse of depropriate theories, principles, evidence and spirinciples, evidence and propriate theories, principles, evidence and propriate theories.	knowledge required for attaining mo and use of named examples. Show on skills. Demonstrate effective use gration of a wide range of appropriating most of the course learning outcome of critical abilities and logical that appropriate and insightful conclusion exhiques. Show evidence of so nonstrate mostly correct use of data egration of appropriate theories, priquired for attaining some of the courle examples. Show evidence of limite da ability to use data and results to iate theories, principles, evidence and is required for attaining the course le vittle or no evidence of critical abilities and results to draw appropriate to a training the course le vittle or no evidence of critical abilities and results to draw appropriate to a training the course le vittle or no evidence of critical abilities.	st or all of the course evidence of significan of data and results to the theories, principles area, with evidence or inking. Apply effective is. Show evidence of the course learning me critical abilities and a and results to drawnciples, evidence and see learning outcomes and techniques. The course is the critical abilities and draw appropriate and techniques. The course is th
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Pass in B Any level  Y 1st A  B  C  D  Fail	IOL1309; and 2 BIOL course  Sem Offer in 2018 - 20 Demonstrate thorough mas learning outcomes, with evicritical abilities and logical through mas learning outcomes, with evicritical abilities and logical through mass and techniques.  Demonstrate substantial consome background reading presentation skills. Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful citechniques.  Demonstrate partial but limit with insufficient evidence of logical thinking. Apply limite insightful conclusions. Show Demonstrate little or no evicence of background Presentational skills are mine evidence of integration of aprith laboratory components.	one of extensive background reading a thinking. Apply highly effective presentation that conclusions. Show evidence of integrammand of knowledge required for attaining and use of named examples. Show evidence of integrammand of knowledge and results to draw a priate theories, principles, evidence and tencomplete command of knowledge and limited background reading and use of named examples. Show evidence of partial intitled command of knowledge and skills. Demonclusions. Show evidence of partial intitled command of knowledge and skills red presentation skills. Demonstrate limite wevidence of limited integration of appropridence of command of knowledge and skill reading or use of named examples. Show inmally effective or ineffective. Misuse of depropriate theories, principles, evidence and tourse	knowledge required for attaining mo and use of named examples. Show on skills. Demonstrate effective use gration of a wide range of appropriating most of the course learning outcome of critical abilities and logical that appropriate and insightful conclusion exhiques. Show evidence of so nonstrate mostly correct use of data egration of appropriate theories, priquired for attaining some of the courle examples. Show evidence of limite da ability to use data and results to iate theories, principles, evidence and is required for attaining the course le vittle or no evidence of critical abilities and results to draw appropriate to a training the course le vittle or no evidence of critical abilities and results to draw appropriate to a training the course le vittle or no evidence of critical abilities.	st or all of the course evidence of significan of data and results to te theories, principles, mes, with evidence of inking. Apply effective is. Show evidence of f the course learning me critical abilities and a and results to drawnciples, evidence and se learning outcomes directly appropriate and draw appropriate and techniques. Paraming outcomes, with each of the control of the course is a critical abilities and draw appropriate and the course is a critical abilities and draw appropriate and the course is a critical abilities and of the course is a critical abilities and of the course is a critical abilities and of the course is a critical abilities. The course is a critical abilities and of the course is a critical abilities and of the course is a critical abilities.

	Project work			12			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		15	CLO 1,3,4,5			
	Examination		70	CLO 1,2,3,4,5			
	Laboratory reports		15	CLO 1,3			
Required/recommended reading and online materials		E. Mayr & P. D. Ashlock: Principles of Systematic Zoology (McGraw-Hill, 1991, 2nd ed.) V. S. Judd et al.: Plant Systematics - A Phylogenetic Approach (Sinauer, 1999)					
Course Website	http://www.biosch.hku.hk/ecology/l	sc/					

BIOL3303	Conservation biology	(6 credits)	Academic Ye	ar 2017	
Offering Department	Biological Sciences	,	Quota	60	
Course Co-ordinator	-	cal Sciences (tbone@hku.hk)	4.5	100	
Teachers Involved	(Dr L G Gibson, Biological	, , ,			
	(Dr T C Bonebrake,Biolog (Prof Y Sadovy,Biological	ical Sciences)			
Course Objectives	To introduce students to understanding of practical ultimate aim is to promot manage them. We hope to	the theory and practice of conservent, economic and management skills receive an understanding of the natural biomese will be your aims too, and that your duce the local, regional and global loss	quired for proficiency in conse diversity, the threats to it, ar u will be able to use the skills	ervation biology. Our of the best ways to	
Course Contents & Topics  Course Learning Outcomes	Among the many environmental issues, the most serious is the increasingly rapid loss of biodiversity. This loss irreversible on a human timescale and will reduce the options available to all future human generation: Conservation Biology/Ecology is the science of preserving biological diversity. This course also provides insights the many benefits and services that nature offers and explores strategies for management options to sustate ecological integrity and production. It is an inexact, applied, mission-orientated, multidisciplinary science which, limedicine, has built-in values: to a conservation biologist, as to a doctor, it matters whether the patient lives or die It is also a very new science, bringing together elements from ecology, environmental science, forestry, resour management and many other fields.  The course is designed to provide the knowledge, theories, and research related to biodiversity conservation. Otteaching focuses on biodiversity conservation, conservation issues associated with climate change, the ket theoretical underpinning of biodiversity conservation and an introduction to conservation legislation and economic We emphasis on the integration of knowledge, skills and abilities that are required to practice conservation. O problem based learning approach will require students to actively participate in their group project/class roo debate by researching.  On successful completion of this course, students should be able to:  CLO 1 develop a framework for critical thinking about biodiversity, environment and human interaction  CLO 2 understand why species are becoming extinct and predict which ones will be most vulnerable  CLO 3 understand the importance of the threat of tropical deforestation, marine and coastal degradation, an habitat fragmentation in species extinction, and explain the main forces behind habitat and biodiversity lost.				
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 4 understand the principles of population viability analysis, the basis of single-species conservated management and the role of ex situ conservation, ecological restoration and reintroduction in conservation.  CLO 5 outline the legal and administrative basis for conservation in Hong Kong and the world appreciate the roles and relationships of economic, social and environmental sciences in the conservation of biodiversity  Pass in BIOL2306				
Offer in 2017 - 2018	Y 2nd sem Offer in 2	2018 - 2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thord outcomes. Show sand synthesize into	buth mastery at an advanced level of extensive strong analytical and critical abilities and logical formation, and ability to apply knowledge to a wissentational skills. Strong evidence of clear attent	knowledge and skills required for atta thinking, with evidence of original the de range of complex, familiar and ur	aining all course learning ought, ability to integrate nfamiliar situations. Apply	
	B Demonstrate subs learning outcomes apply knowledge	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking			
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking.				
	Show evidence of integration. Show attention to though	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking.			
	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lact of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.				
Course Type	Lecture with laboratory co	•			
Course Teaching	Activities	Details		No. of Hours	
& Learning Activities	Lectures			24	
-	Field work			10	
	Group work			8	
	Tutorials			14	
	Reading / Self study			100	
Annanament Matter at		B 4 7	W. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	

	Assignments		20	CLO 1,2,3,4,5,6
	Examination		60	CLO 1,2,3,4,5,6
	Presentation	group presentation	10	CLO 1,2,3,5,6
	Test		10	CLO 1,2,3
Required/recommended reading and online materials	R. B. Primack: Essentials of Conse V. D. Fred: Conservation biology [a M.L. Hunter and J.P. Gibbs: Funda William J. Sutherland: The Conser NIL	electronic resource]: foundations, camentals of Conservation Biology (	oncepts, applications (Sp Blackwell, 2007, 3rd Ed)	• ,
Course Website	http://www.biosch.hku.hk/ecology/	lsc/		

BIOL3305	Tropical credits)	and temperate r	marine ecology field course (6	Academic Ye	2017		
Offering Department	Biological	Sciences		Quota	15		
Course Co-ordinator			ces (brussell@hku.hk)	100			
Teachers Involved	(Dr B Russ	sell,Biological Scien nicci,Biological Scie	ces)				
Course Objectives			ed approach to provide students with	an advanced understand	ding of marine an		
	estuarine of	ecology in both trop	pical and temperate regions. Students weir similarities and differences.		•		
Course Contents			cture and function of mangrove forests	, reefs (coral and rocky),	and algal forests		
& Topics	online mod online mod activities t	ooth tropical and temperate regions. Students will be introduced to the concepts in the course through a serie inline modules before travelling to northern and southern Australia to experience the ecosystems in the field. inline modules will consist of videos, reading and intivities to provide students with background knowledge about the ecosystems which they will encounter, tructure and function of the systems, and how human activities degrade them. These concepts will be dr					
	together in	tructure and function of the systems, and how human activities degrade them. These concepts will be ogether in the field with students quantifying species richness, observing system structure and testing the significant relationships with experiments.					
		trophic relationships with experiments.  n successful completion of this course, students should be able to:					
Course Learning		•					
Outcomes			standing of the complexity and function	•			
			sical and biological processes in shapin	- · · · · · · · · · · · · · · · · · · ·			
			ities and differences among marine eco	•	mperate regions.		
			field sampling in marine and estuarine h				
			rine species and their role in ecosystem				
		monstrate an unde osystems.	erstanding of how human activities rec	duce the function of ma	rine and estuarine		
Pre-requisites	Pass in BI	OL2306 or BIOL330	)1				
(and Co-requisites and Impermissible							
combinations)							
Offer in 2017 - 2018		nmer Offer in 2018		Examination	No Exam		
Grade Descriptors (A+ to F)	Α	familiarity with relevant skills. Ample evidence comparative perspective	grasp of the subject and relevant research techn background reading and case studies. Exemplar of independent critical thought with excellent use we to draw insightful and logical conclusions. Sh excellent analytical argumentation. Excellent or	handling of field data collection of a broad range of fundament ow outstanding abilities of inde	and excellent analytic al concepts and broad pendent work, effectiv		
	Evidence of a good grasp of the subject and relevant research techniques. Interest in learning and good-to-moderate familiarity with relevant background reading and case studies. Good handling of field data collection and commendable analytical skills. Good evidence of critical thought (although not always independent), with an appreciable use of fundamental concepts and consideration of broader comparative perspective in drawing logical conclusions. Good abilities of independent work, effective presentation skills with logical and analytical argumentation. Work more than sufficient for what is required at degree level.						
	С	Demonstrate an adequate, but incomplete grasp of the subject and relevant research techniques. Moderate familiarity with relevant background reading and case studies, but no interest in learning beyond the adequate average level. Evidence of logica critical thinking (although not always independent), with mostly good use of fundamental concepts to draw logical conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.					
	D Demonstrate some grasp of the subject, but only partial and with limited understanding of relevant research concepts and research techniques. Some familiarity with relevant case studies, but insufficient evidence of background reading and limited abilities of critical independent thinking. Ineffective presentation skills with generally weak logical argumentation with restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.						
	Fail	No evidence of basic background reading ar thought; ineffective pre reach degree level.	a minimum grasp of the subject and the min nd no familiarity with any relevant examples and esentation skills with poor argumentation and no	imum relevant research techn case studies. Inadequate evide	ence of coherent logic		
Course Type	Field camp						
Course Teaching	Activities		Details		No. of Hours		
	Lectures		Pre-course online modules				
& Learning Activities		(			10		
& Learning Activities	Field work				10 80		
•	Field work Reading /	Self study			10		
Assessment Methods	Field work		Details	Weighting in final course grade (%)	10 80		
Assessment Methods	Field work Reading /	Self study	Details  Popular media article (15%), Presentation (20%)		10 80 40 Assessment Methods		
Assessment Methods	Field work Reading / Methods	Self study	Popular media article (15%),	course grade (%)	10 80 40 Assessment Methods to CLO Mapping		
Assessment Methods	Field work Reading / Methods Assignme	Self study	Popular media article (15%),	course grade (%)	10 80 40 Assessment Methods to CLO Mapping		
Assessment Methods and Weighting Required/recommended reading and	Field work Reading / Methods Assignme Report Test	Self study	Popular media article (15%),	course grade (%) 35 60	10 80 40 Assessment Methods to CLO Mappin CLO 2,3,5,6 CLO 1,2,3,4,5,6		
Assessment Methods and Weighting  Required/recommended reading and online materials	Field work Reading / Methods Assignme Report Test Students v	Self study ents will be directed to rel	Popular media article (15%), Presentation (20%)	course grade (%) 35 60	10 80 40 Assessment Methods to CLO Mappin CLO 2,3,5,6 CLO 1,2,3,4,5,6		
& Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials  Course Website Additional Course	Field work Reading / Methods Assignme Report Test Students v	Self study ents will be directed to rel	Popular media article (15%), Presentation (20%)	35 60 5	10 80 40 Assessment Methods to CLO Mappin CLO 2,3,5,6 CLO 1,2,3,4,5,6 CLO 1,3,5,6		

There will be extra costs involved in the course, including but not limited to airfares, accommodation and some meal costs.
This course will be offered subject to a minimum enrollment number and availability of teachers.

BIOL3313		ater ecology (6 credi	ts)	Academic Ye		
Offering Department		Sciences		Quota	30	
Course Co-ordinator	Prof D Du	idgeon, Biological Scienc	ces (ddudgeon@hku.hk)			
Feachers Involved	This seem	:				
Course Objectives	This course introduces freshwater science by integrating the physical and biological components of rivers and their drainage basins in the context of sustaining human livelihoods and biodiversity. Conservation and management of lakes and maintenance of water quality are considered also. Case studies are used to illustrate the principles of river science and human use of drainage basins. Emphasis will be placed upon conservation of freshwater biodiversity in Asia in the context of increasing human modification of ecosystems, habitat degradation and water scarcity.					
Course Contents & Topics	The amount of water on Earth is fixed. Less than 0.01% of the world's water is in lakes and rivers, yet this water hosts 10% of the Earth's species. Global water use has increased 300% since 1950 and is growing faster than the Earth's population; many people in Asia already face water stress. This course introduces the physicochemical processes involved in the hydrological cycle and flow of water in drainage basins, as well as their seasonal fluctuations, and describes the main longitudinal changes that occur along rivers and their floodplains. Energy flows in freshwater ecosystems are described with particular reference to the transfer of materials between water and land and the relative importance of aquatic primary production versus energy derived from detrital inputs from the land. The range of organisms associated with Asian fresh waters is introduced and their functional roles explained, and students will become familiar with some common Hong Kong species in field trips and laboratory sessions. The dependence of humans on freshwater ecosystems and the role they play in sustaining livelihoods is explained, together with the causes and consequences of human modification of fresh waters, and the implications for conservation of aquatic biodiversity. Finally the range of management strategies used to reduce or mitigate human impacts on freshwater ecosystems and maintain water quality is introduced.					
Course Learning		•		io introducca.		
Outcomes	CLO 1 de in CLO 2 de ec CLO 3 de fre	On successful completion of this course, students should be able to:  CLO 1 describe the global water cycle, the main sources and pathways of energy in freshwaters, and the influence of land-water interactions on aquatic productivity  CLO 2 describe the composition of the freshwater biota (major groups) and their functional roles in aquatic ecosystems, and identify some of the common animals that occur in Hong Kong fresh waters  CLO 3 describe the results of modification of freshwater ecosystems by humans, list the main threats to freshwater biodiversity in Asia, explain why freshwater biota are vulnerable to human impacts, and indicate				
Pre-requisites		IOL2102 and BIOL2306	s used to reduce or mitigate them			
and Co-requisites and Impermissible combinations)	1 466 111 2	TOLETOE WING BIOLEGOO				
Offer in 2017 - 2018	N Off	er in 2018 - 2019 : Y		Examination		
Grade Descriptors (A+ to F)	В	demonstrated by backgrous analytical skills and/or lab/file outstanding (for A+) work rel Evidence of analytical (or cr subject as demonstrated by and/or lab/filed skills, and ki required at degree level. Evidence of some analytical subject, but little or no evide Show fair presentational, ar	(or coherent) thought, strong analytical (or nd reading and excellent use of named eld skills, and substantial knowledge of gen ative to what is required at degree level. itical) abilities and logical (or coherent) - bi background reading and use of named (or nowledge of general freshwater biodiversity (or critical) abilities and logical (or coherent ence of original thinking, with limited backgralytical and/or lab/field skills, and some k	(organism) examples. Show earl freshwater biodiveristy or set it not necessarily original - think ganism) examples. Show good or selected taxa. Work more to thinking with an adequate (but round reading and use of name	excellent presentational, elected taxa. Excellent or sing, a good grasp of the presentational, analytical han sufficient for what is incomplete) grasp of the ed (organism) examples.	
	taxa. Work sufficient for what is required for degree level.  D Evidence of retention of a minimum of relevant information of the subject (i.e. knowledge is very incomplete), with limited organizational, analytical or presentational skills. Shows insufficient evidence of background reading, or familiarity with lab/field techniques or freshwater biodiversity. Work merely (for D+) or barely (D) adequate for what is required at degree level.  Fail Evidence of poor or inadequate knowledge and understanding of the subject, and a lack of coherence, poor organization and/or excessive irrelevancy. Little or no evidence of familiarity with relevant reading material and lab/field techniques, or any					
		knowledge of freshwater bio	diversity. Work fails to reach degree level.			
Course Type	-	ith laboratory component			M	
Course Teaching	Activities	S	Details		No. of Hours	
	Lectures Laboratory				26	
			project and laboratory work; field and wetlands	d trips to local streams	26 40	
	Laborato			d trips to local streams		
& Learning Activities  Assessment Methods and Weighting	Laborato	ry / Self study		Weighting in final course grade (%)	40	
& Learning Activities  Assessment Methods	Laborato	ry / Self study	and wetlands	Weighting in final	40 100 Assessment Methods to CLO Mapping CLO 2	
& Learning Activities  Assessment Methods	Laborator Reading Methods	ry / Self study s	and wetlands	Weighting in final course grade (%)  30 60	40 100 Assessment Methods to CLO Mapping CLO 2 CLO 1,2,3	
& Learning Activities  Assessment Methods	Laborato Reading Methods Assignme Examinat Laborato	ry / Self study ents tion ry reports	and wetlands  Details	Weighting in final course grade (%)	40 100 Assessment Methods to CLO Mapping CLO 2	
& Learning Activities  Assessment Methods	Assignme Examinat Laborato I Allan, J.D The Mekc An online informatic health.	ents tion ry reports . & Castillo, M.M. (2007). ong River Awareness Kit e training tool develope on on the physical and b	and wetlands  Details  Stream Ecology. Springer.  (RAK) http://www.mrcmekong.org/ld by an international team (includiological features of rivers, and sh	Weighting in final course grade (%)  30 60 10  RAK/html/rak_frameset.htmlding the course coordinates how human livelihood	40 100 Assessment Methods to CLO Mapping CLO 2 CLO 1,2,3 CLO 3  ml lator) that contains ods depend on river	
Assessment Methods and Weighting  Required/recommended eading and online materials	Laborato Reading Methods  Assignme Examinat Laborato I Allan, J.D The Meko An online informatio health. A list of re	ents tion ry reports . & Castillo, M.M. (2007). ong River Awareness Kit e training tool develope on on the physical and b	Details  Stream Ecology. Springer.  (RAK) http://www.mrcmekong.org/ld by an international team (incluiological features of rivers, and should be provided for each labeled to the contract of	Weighting in final course grade (%)  30 60 10  RAK/html/rak_frameset.htmlding the course coordinates how human livelihood	40 100 Assessment Methods to CLO Mapping CLO 2 CLO 1,2,3 CLO 3  ml lator) that contains ods depend on river	
& Learning Activities  Assessment Methods and Weighting  Required/recommended	Laborato Reading Methods  Assignme Examinat Laborato I Allan, J.D The Mekc An online informatic health. A list of re http://www	ents tion ry reports . & Castillo, M.M. (2007). ong River Awareness Kit e training tool develope on on the physical and b	and wetlands  Details  Stream Ecology. Springer.  (RAK) http://www.mrcmekong.org/fd by an international team (incluiological features of rivers, and should be provided for each lace/	Weighting in final course grade (%)  30 60 10  RAK/html/rak_frameset.htmlding the course coordinates how human livelihood	40 100 Assessment Methods to CLO Mapping CLO 2 CLO 1,2,3 CLO 3  ml lator) that contains ods depend on river	

BIOL3314	Plant str	ucture and evolution	on (6 credits)	Academic Year	2017		
Offering Department	Biological	Sciences		Quota	30		
Course Co-ordinator	Prof R M k	K Saunders, Biological S	Sciences (saunders@hku.hk)				
Teachers Involved	(Prof R M	K Saunders, Biological S	Sciences)				
Course Objectives	significand	To survey the form and function of the vascular plant body, with particular emphasis on the evolutionary significance of structures. This course forms a basis for understanding plant physiology, ecology, systematics and shylogenetics.					
Course Contents & Topics	explanation Information taxonomic water cond	The course will investigate various cell, tissue and organ types in the vascular plant body, with functional explanations for their diversity and discussions of the value of such knowledge in understanding plant phylogeny. Information on plant structure will be integrated with our current understanding of developmental genetics and axonomic relationships derived from molecular phylogenetic research. Topics such as food storage, strength, water conduction, growth and development, pollination, fertilization, fruit and seed dispersal, germination, etc., will be discussed.					
Course Learning	On succes	ssful completion of this of	course, students should be a	ble to:			
Outcomes	(SI	uch as the xylem and ph	nloem)	cells are integrated to form specifi			
				nary tissues with the onset of secon			
			•	condary vegetative structures (woo	,		
	CLO 5 de		•	elopment with the evolution of orga respective, and recognise how thes	•		
		plain how seeds develor rmination patterns	p after fertilization of the ovu	ule, and how differences in seed st	ructure influences		
Pre-requisites (and Co-requisites and Impermissible combinations)		OL1309; and 2 BIOL course					
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	0010 · V	Examination	Mov		
	A 2110				May		
Grade Descriptors (A+ to F)	learning outcomes, with evidence of extensive background reading and use of named examples. Show evidence of significant critical abilities and logical thinking. Apply highly effective presentation skills. Demonstrate effective use of data and results to draw appropriate and insightful conclusions.						
(AT 10 F)	В	critical abilities and logical draw appropriate and insight Demonstrate substantial co	thinking. Apply highly effective prestful conclusions.  mmand of knowledge required for a	sentation skills. Demonstrate effective use attaining most of the course learning outco	of data and results to mes, with evidence of		
(AT TO F)	В	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonsi	thinking. Apply highly effective pre- tful conclusions. mmand of knowledge required for and use of named examples. Show trate use of data and results to draw	sentation skills. Demonstrate effective use	of data and results to mes, with evidence of inking. Apply effective		
(AT TO F)	С	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co	thinking. Apply highly effective pre- tful conclusions.  mmand of knowledge required for- and use of named examples. Show trate use of data and results to draw ncomplete command of knowledge limited background reading and use lerately effective presentation skills onclusions.	sentation skills. Demonstrate effective use attaining most of the course learning outco veridence of critical abilities and logical this vappropriate and insightful conclusions. e and skills required for attaining most of e of named examples. Show evidence of soi s. Demonstrate mostly correct use of data	of data and results to mes, with evidence of inking. Apply effective f the course learning me critical abilities and a and results to draw		
(AT TO F)		critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonst Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limi with insufficient evidence o	thinking. Apply highly effective pre- tful conclusions.  mand of knowledge required for and use of named examples. Show trate use of data and results to draw ncomplete command of knowledge limited background reading and use lerately effective presentation skills onclusions. ited command of knowledge and slifed command of knowledge and slifed background reading and use of	sentation skills. Demonstrate effective use attaining most of the course learning outco veridence of critical abilities and logical this vappropriate and insightful conclusions. e and skills required for attaining most of the of named examples. Show evidence of son	of data and results to mes, with evidence of inking. Apply effective f the course learning me critical abilities and a and results to draw se learning outcomes, d critical abilities and		
	C D Fail	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonsi Demonstrate general but outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limi with insufficient evidence o logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are min	thinking. Apply highly effective pre- tful conclusions.  mmand of knowledge required for and use of named examples. Show trate use of data and results to draw ncomplete command of knowledge limited background reading and use lerately effective presentation skills onclusions. ited command of knowledge and sl f background reading and use of ed presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples simally effective or ineffective. Misus	sentation skills. Demonstrate effective use attaining most of the course learning outco vevidence of critical abilities and logical thi vappropriate and insightful conclusions. e and skills required for attaining most of e of named examples. Show evidence of sor s. Demonstrate mostly correct use of data kills required for attaining some of the cours named examples. Show evidence of limite	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and a and results to draw see learning outcomes, of critical abilities and draw appropriate and arning outcomes, with as and logical thinking.		
Course Type	C D Fail Lecture wi	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonsi Demonstrate general but outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limiwith insufficient evidence o logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are minith laboratory component	thinking. Apply highly effective pre- tful conclusions.  mmand of knowledge required for and use of named examples. Show trate use of data and results to draw ncomplete command of knowledge ilmited background reading and use lerately effective presentation skills onclusions. ited command of knowledge and sl f background reading and use of ed presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples simally effective or ineffective. Misus tt course	sentation skills. Demonstrate effective use attaining most of the course learning outco vevidence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of e of named examples. Show evidence of sor so. Demonstrate mostly correct use of data kills required for attaining some of the cours named examples. Show evidence of limite e limited ability to use data and results to and skills required for attaining the course le. Show little or no evidence of critical abilitie.	of data and results to mes, with evidence of inking. Apply effective f the course learning me critical abilities and a and results to draw se learning outcomes, d critical abilities and draw appropriate and arming outcomes, with a sand logical thinking onclusions.		
Course Type Course Teaching	D Fail Lecture wi	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonsi Demonstrate general but outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limiwith insufficient evidence o logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are minith laboratory component	thinking. Apply highly effective pre- tful conclusions.  mmand of knowledge required for and use of named examples. Show trate use of data and results to draw ncomplete command of knowledge limited background reading and use lerately effective presentation skills onclusions. ited command of knowledge and sl f background reading and use of ed presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples simally effective or ineffective. Misus	sentation skills. Demonstrate effective use attaining most of the course learning outco vevidence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of e of named examples. Show evidence of sor so. Demonstrate mostly correct use of data kills required for attaining some of the cours named examples. Show evidence of limite e limited ability to use data and results to and skills required for attaining the course le. Show little or no evidence of critical abilitie.	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and a and results to draw se learning outcomes, dicritical abilities and draw appropriate and arning outcomes, with earning outcomes, with earning outcomes, with earning outcomes.  No. of Hours		
Course Type Course Teaching	C D Fail Lecture wi	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonsi Demonstrate general but outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limiwith insufficient evidence o logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are minith laboratory component	thinking. Apply highly effective pre- tful conclusions.  mmand of knowledge required for and use of named examples. Show trate use of data and results to draw ncomplete command of knowledge ilmited background reading and use lerately effective presentation skills onclusions. ited command of knowledge and sl f background reading and use of ed presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples simally effective or ineffective. Misus tt course	sentation skills. Demonstrate effective use attaining most of the course learning outco vevidence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of e of named examples. Show evidence of sor so. Demonstrate mostly correct use of data kills required for attaining some of the cours named examples. Show evidence of limite e limited ability to use data and results to and skills required for attaining the course le. Show little or no evidence of critical abilitie.	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and a and results to draw se learning outcomes, dirtical abilities and draw appropriate and arming outcomes, with se and logical thinking onclusions.  No. of Hours 24		
Course Type Course Teaching	C D Fail Lecture wi Activities Lectures Laborator	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limi with insufficient evidence o logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are minith laboratory components.	thinking. Apply highly effective pre- tful conclusions.  mmand of knowledge required for and use of named examples. Show trate use of data and results to draw ncomplete command of knowledge ilmited background reading and use lerately effective presentation skills onclusions. ited command of knowledge and sl f background reading and use of ed presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples simally effective or ineffective. Misus tt course	sentation skills. Demonstrate effective use attaining most of the course learning outco vevidence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of e of named examples. Show evidence of sor so. Demonstrate mostly correct use of data kills required for attaining some of the cours named examples. Show evidence of limite e limited ability to use data and results to and skills required for attaining the course le. Show little or no evidence of critical abilitie.	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and a and results to draw se learning outcomes, dicritical abilities and draw appropriate and arning outcomes, with earning outcomes, with earning outcomes, with earning outcomes.  No. of Hours		
Course Type Course Teaching	C D Fail Lecture wi Activities Lectures Laborator	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonst Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limi with insufficient evidence of logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are min ith laboratory components.	thinking. Apply highly effective pre- tful conclusions.  mmand of knowledge required for and use of named examples. Show trate use of data and results to draw ncomplete command of knowledge ilmited background reading and use lerately effective presentation skills onclusions. ited command of knowledge and sl f background reading and use of ed presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples simally effective or ineffective. Misus tt course	sentation skills. Demonstrate effective use attaining most of the course learning outco vevidence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of e of named examples. Show evidence of sor so. Demonstrate mostly correct use of data kills required for attaining some of the cours named examples. Show evidence of limite e limited ability to use data and results to and skills required for attaining the course le. Show little or no evidence of critical abilitie.	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and a and results to draw se learning outcomes, did critical abilities and draw appropriate and arning outcomes, with se and logical thinking onclusions.  No. of Hours 24		
Course Type Course Teaching & Learning Activities Assessment Methods	C D Fail Lecture wi Activities Lectures Laborator	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limi with insufficient evidence o logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are minith laboratory components.	thinking. Apply highly effective pre- tful conclusions.  mmand of knowledge required for and use of named examples. Show trate use of data and results to draw ncomplete command of knowledge ilmited background reading and use lerately effective presentation skills onclusions. ited command of knowledge and sl f background reading and use of ed presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples simally effective or ineffective. Misus tt course	sentation skills. Demonstrate effective use attaining most of the course learning outco veridence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of the constrained examples. Show evidence of sorts. Demonstrate mostly correct use of data skills required for attaining some of the course mamed examples. Show evidence of limite to limited ability to use data and results to and skills required for attaining the course le. Show little or no evidence of critical abilities are of data and results to draw appropriate of data and results to draw appropriate of the course of data and results to draw appropriate of the course of data and results to draw appropriate of the course grade (%)	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and a and results to draw se learning outcomes, or critical abilities and draw appropriate and arming outcomes, with se and logical thinking onclusions.  No. of Hours  24  36		
Course Type Course Teaching & Learning Activities Assessment Methods	C D Fail Lecture wi Activities Lectures Laborator Reading /	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonst Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limi with insufficient evidence of logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are min ith laboratory components.	thinking. Apply highly effective prestful conclusions. mmand of knowledge required for and use of named examples. Show trate use of data and results to draw neomplete command of knowledge limited background reading and use lerately effective presentation skills onclusions. Ited command of knowledge and slif background reading and use of ead presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples immally effective or ineffective. Misus it Course    Details	sentation skills. Demonstrate effective use attaining most of the course learning outco veridence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of the constrained examples. Show evidence of sorts. Demonstrate mostly correct use of data skills required for attaining some of the course mamed examples. Show evidence of limite to limited ability to use data and results to and skills required for attaining the course le. Show little or no evidence of critical abilities are of data and results to draw appropriate of data and results to draw appropriate of the course of data and results to draw appropriate of the course of data and results to draw appropriate of the course grade (%)	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and a and results to draw se learning outcomes, or critical abilities and draw appropriate and arming outcomes, with a and logical thinking. onclusions.  No. of Hours 24 36 100 Assessment Methods		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail Lecture wi Activities Lectures Laborator Reading / Methods	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonst Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful combinate and insightful with insufficient evidence of logical thinking. Apply limite insightful conclusions.  Demonstrate little or no evidence of background Presentational skills are min ith laboratory components.	thinking. Apply highly effective prestful conclusions. mmand of knowledge required for and use of named examples. Show trate use of data and results to draw neomplete command of knowledge limited background reading and use lerately effective presentation skills onclusions. Ited command of knowledge and slif background reading and use of ead presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples immally effective or ineffective. Misus it Course    Details	sentation skills. Demonstrate effective use attaining most of the course learning outco veridence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of the constrained examples. Show evidence of sorts. Demonstrate mostly correct use of data skills required for attaining some of the course mamed examples. Show evidence of limite to limited ability to use data and results to and skills required for attaining the course less of data and results to a skills required for attaining the course less of data and results to draw appropriate course of data and results to draw appropriate course grade (%)	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and and results to draw se learning outcomes, or critical abilities and draw appropriate and arring outcomes, with as and logical thinking. Inclusions.  No. of Hours 24 36 100 Assessment Methods to CLO Mapping		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  Lecture wi Activities Lectures Laborator Reading / Methods  Examinati Laborator P. Rudall: P.H. Rave	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonstrate general but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limi with insufficient evidence of logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are min ith laboratory components.  Self study  ion  y reports  Anatomy of Flowering Fen, R.F. Evert & S.E. Eice	thinking. Apply highly effective prestful conclusions. mmand of knowledge required for and use of named examples. Show trate use of data and results to draw necomplete command of knowledge limited background reading and use lerately effective presentation skills proclusions. Ited command of knowledge and slif background reading and use of ed presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples immally effective or ineffective. Misus at course    Details   Details	sentation skills. Demonstrate effective use attaining most of the course learning outco veridence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of the of named examples. Show evidence of sorts. Demonstrate mostly correct use of data kills required for attaining some of the course named examples. Show evidence of limite the limited ability to use data and results to and skills required for attaining the course leads in the second straining that the course leads of the course of data and results to draw appropriate course of data and results to draw appropriate course grade (%)  Weighting in final course grade (%)  70 30 niv. Press (2007) ed. Freeman (2005)	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and and results to draw se learning outcomes, of critical abilities and draw appropriate and arring outcomes, with a and logical thinking. onclusions.  No. of Hours  24  36  100  Assessment  Methods  to CLO Mapping  CLO 1,2,3,4,5,6		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	C D Fail Lecture wi Activities Lectures Laborator Reading / Methods  Examinati Laborator P. Rudall: P.H. Rave A list of act	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonstrate partial but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limi with insufficient evidence of logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are min ith laboratory components.  Self study  Self study  ion  y reports  Anatomy of Flowering Fan, R.F. Evert & S.E. Eic diditional reading material	thinking. Apply highly effective prestful conclusions. mmand of knowledge required for and use of named examples. Show trate use of data and results to draw necomplete command of knowledge limited background reading and use lerately effective presentation skills onclusions. Ited command of knowledge and slif background reading and use of ead presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples immally effective or ineffective. Misus at Course    Details   Details	sentation skills. Demonstrate effective use attaining most of the course learning outco veridence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of the of named examples. Show evidence of sorts. Demonstrate mostly correct use of data kills required for attaining some of the course named examples. Show evidence of limite the limited ability to use data and results to and skills required for attaining the course leads in the second straining that the course leads of the course of data and results to draw appropriate course of data and results to draw appropriate course grade (%)  Weighting in final course grade (%)  70 30 niv. Press (2007) ed. Freeman (2005)	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and and results to draw se learning outcomes, of critical abilities and draw appropriate and draw appropr		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	C D Fail Lecture wi Activities Lectures Laborator Reading / Methods  Examinati Laborator P. Rudall: P.H. Rave A list of achttp://www.	critical abilities and logical draw appropriate and insigh Demonstrate substantial co some background reading a presentation skills. Demonstrate partial but in outcomes, with evidence of logical thinking. Apply mod appropriate and insightful co Demonstrate partial but limi with insufficient evidence o logical thinking. Apply limite insightful conclusions. Demonstrate little or no evidence of background Presentational skills are min th laboratory components.  Y Self study  ion y reports Anatomy of Flowering Fen, R.F. Evert & S.E. Eic Idditional reading material belonger in the constant of the constan	thinking. Apply highly effective prestful conclusions. mmand of knowledge required for and use of named examples. Show trate use of data and results to draw necomplete command of knowledge limited background reading and use learetly effective presentation skills onclusions. Ited command of knowledge and sif background reading and use of ed presentation skills. Demonstrate dence of command of knowledge a reading or use of named examples itimally effective or ineffective. Misus it course    Details   Details	sentation skills. Demonstrate effective use attaining most of the course learning outco veridence of critical abilities and logical this appropriate and insightful conclusions. e and skills required for attaining most of the of named examples. Show evidence of sorts. Demonstrate mostly correct use of data kills required for attaining some of the course named examples. Show evidence of limite the limited ability to use data and results to and skills required for attaining the course leads in the second straining that the course leads of the course of data and results to draw appropriate course of data and results to draw appropriate course grade (%)  Weighting in final course grade (%)  70 30 niv. Press (2007) ed. Freeman (2005)	of data and results to mes, with evidence of inking. Apply effective of the course learning me critical abilities and and results to draw se learning outcomes, of critical abilities and draw appropriate and draw appropr		

BIOL3318	Experimental intertidal ecology (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	20
Course Co-ordinator	Prof G A Williams, Biological Sciences (hrsbwga@hku.hk)		
Teachers Involved			
Course Objectives	To examine the communities of coastal systems: their distribution, composition them. This course will examine, using an experimental approach, patterns exhibited eterministic and stochastic processes that create and sustain them. Hong Kombut comparisons will be drawn from the coastlines of the world.	bited by a range of	of shores and the
Course Contents & Topics	The first part of this course describes shores of the marine to brackish water cor on them. Lectures will cover the physical environment of the intertidal (e hydrological processes) the resultant variations in exposure and shore type animals and algae on these shores (vertical and horizontal zonation par examples. The second part of the course uses an experimental approamanipulative techniques; experimental design and data analysis) to investing herbivory; competition; disturbance; succession; patchiness and recruitment; succession; with particular focus on rocky intertidal shores.	.g. tides; waves; s and consequenterns) with spec ch (e.g. samplingate the factors	geological and nt distribution of ific Hong Kong g methodology; (e.g. predation;
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe the physical environmental factors (e.g., waves, tides) shaping	the intertidal envir	onment and how

		uncy interact with ge	ographic features to produce diffe	erent kinds of shores (e.g., sandy	shores, mangroves)			
	CLO 2 ι	understand the fac	tors limiting species distributio	n patterns on the vertical inte	rtidal gradient and			
		appreciate methods to measure and investigate these patterns CLO 3 identify and quantify the distribution of a variety of local species on different Hong Kong shores						
		, ,	,		•			
	(	(e.g., herbivory, com	petition) in intertidal areas	investigate patterns (e.g., zonat	, ,			
			iological processes (e.g., predation intertidal communities	on, succession) and their interact	ion with the physical			
	CLO 6 p	plan, design, execut	e, analyse and present a simple	experimental study on intertidal ed	cology			
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOL2102 or BIOL3301						
Offer in 2017 - 2018	N O	offer in 2018 - 2019 :		Examination				
Grade Descriptors (A+ to F)	A	demonstrated by ba	ackground reading and excellent use of or lab/field skills, and demonstrate su	alytical and critical abilities and a thoroug of named (organism) examples. Show abstantial knowledge of general intertida	excellent presentational,			
	В	·						
	С	Evidence of some analytical (or critical) abilities and logical (or coherent) thinking with an adequate (but incomplete) grasp of the subject, but little or no evidence of original thinking, limited background reading and use of named (organism) examples. Show fair presentational, analytical and/or lab/field skills, and demonstrates some knowledge of general intertidal ecology and adequate abilities of experimental design and analysis.						
	D	·						
	Fail	Evidence of poor or in excessive irrelevance		g of the subject, and a lack of coherence,				
		of general intertidal e	ecology, and misuse of experimental design					
Course Type	Lecture v		ecology, and misuse of experimental design					
	Lecture v	with laboratory comp	ecology, and misuse of experimental design					
Course Teaching	Activitie	with laboratory compes	ecology, and misuse of experimental designment course		techniques, or knowledge			
Course Teaching		with laboratory comp es s	ecology, and misuse of experimental designment course		No. of Hours			
Course Teaching	Activities Lectures Field wo	with laboratory comp <b>es</b> s ork	cology, and misuse of experimental designment course  Details		No. of Hours			
Course Teaching	Activitie Lectures	with laboratory comp es s ork work	cology, and misuse of experimental designment course  Details		No. of Hours 16 28			
Course Type Course Teaching & Learning Activities	Activities Lectures Field wo Project v Tutorials	with laboratory comp es s ork work s	cology, and misuse of experimental designment course  Details		No. of Hours 16 28 6			
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Field wo Project v Tutorials	with laboratory compes s ork work s g / Self study	cology, and misuse of experimental designment course  Details		No. of Hours 16 28 6 4			
Course Teaching Learning Activities Assessment Methods	Activitie Lectures Field wo Project v Tutorials Reading	with laboratory compes es s ork work s g / Self study	cology, and misuse of experimental designment course  Details  field trip/project work	gn and analysis skills.  Weighting in final	No. of Hours 16 28 6 4 100 Assessment Methods			
Course Teaching Learning Activities Assessment Methods	Activitie Lectures Field wo Project v Tutorials Reading Method	with laboratory compes es s ork work s g / Self study ls ments	cology, and misuse of experimental designment course  Details  field trip/project work	gn and analysis skills.  Weighting in final course grade (%)	No. of Hours  16 28 6 4 100  Assessment Methods to CLO Mapping			
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activitie Lectures Field wo Project of Tutorials Reading Method  Assignm Examina Morton,	with laboratory compes s s ork work s g / Self study ls nents ation B. & Morton, J.: The	ponent course  Details  field trip/project work  Details  Details  Seashore Ecology of Hong Kong	gn and analysis skills.  Weighting in final course grade (%)	No. of Hours  16 28 6 4 100 Assessment Methods to CLO 1,2,3,4,5,6 CLO 1,2,3,4,5			
Course Teaching Learning Activities  Assessment Methods and Weighting  Required/recommended	Activitie Lectures Field wo Project of Tutorials Reading Method  Assignm Examina Morton, Little, C. TBC	with laboratory compes s s ork work s g / Self study ls nents ation B. & Morton, J.: The	ponent course  Details  field trip/project work  Details  Details  Seashore Ecology of Hong Kong Trowbridge, C.D.: The Biology of	Weighting in final course grade (%)  40 60 g (Hong Kong University Press, 1)	No. of Hours  16 28 6 4 100 Assessment Methods to CLO 1,2,3,4,5,6 CLO 1,2,3,4,5			

BIOL3319	Tropical terrestrial ecology (6 credits)	Academic Year	2017					
Offering Department	Biological Sciences	Quota	30					
Course Co-ordinator	Dr B Guenard, Biological Sciences (bguenard@hku.hk)							
Teachers Involved	(Dr B Guenard, Biological Sciences)							
Course Objectives	To enable motivated students to acquire the knowledge and skills needed to solve real problems in terrestri- ecology.							
Course Contents & Topics	East Asia, but the course will also include an overview of patterns and first learn about the geological history of the land mass on earth, the bit terrestrial ecosystems, especially in Tropical East Asia. Then, stude processes including herbivory, carnivory, pollination, seed dispersal an second half of the course will start with the degraded terrestrial ecosystof ecological succession. Restoration ecology and how tropical forests of other major threats to terrestrial ecosystems including alien invasive spin	d processes on a global sc plogeography and broad dis- ents will begin to learn di- and energy flow in terrestrial stems nowadays and the in- can be restored will then be- plecies and wildfire will also the swith an alternative mode of the basic field techniques u	This course will focus on the ecology of terrestrial habitats. The emphasis will be on the tropics, especially tropical East Asia, but the course will also include an overview of patterns and processes on a global scale. Students will first learn about the geological history of the land mass on earth, the biogeography and broad distribution of major terrestrial ecosystems, especially in Tropical East Asia. Then, students will begin to learn different important processes including herbivory, carnivory, pollination, seed dispersal and energy flow in terrestrial ecosystems. The second half of the course will start with the degraded terrestrial ecosystems nowadays and the important process of ecological succession. Restoration ecology and how tropical forests can be restored will then be introduced. Two other major threats to terrestrial ecosystems including alien invasive species and wildfire will also be addressed.  Two problem-based learning exercises are included to provide students with an alternative mode of learning.					
Course Learning		o data, and write a eriert eer	entitic paper					
Course Learning	On successful completion of this course, students should be able to:		entific paper.					
Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand evolution of biodiversity patterns and shaping p different geographic and time scales	processes within terrestrial						
•	CLO 1 understand evolution of biodiversity patterns and shaping p different geographic and time scales		ecosystems at					
	CLO 1 understand evolution of biodiversity patterns and shaping p	pristine form and disturbed	ecosystems at					
•	CLO 1 understand evolution of biodiversity patterns and shaping p different geographic and time scales CLO 2 understand the current patterns that sustain biodiversity in their CLO 3 understand the various threats to ter	pristine form and disturbed	ecosystems at					
	CLO 1 understand evolution of biodiversity patterns and shaping p different geographic and time scales CLO 2 understand the current patterns that sustain biodiversity in their CLO 3 understand the various threats to terrestrial ecosystems and so the impacts of those threats CLO 4 plan and conduct baseline study of terrestrial biodiversity	r pristine form and disturbed ome of the methods to eval	ecosystems a					
	CLO 1 understand evolution of biodiversity patterns and shaping p different geographic and time scales CLO 2 understand the current patterns that sustain biodiversity in their CLO 3 understand the various threats to terrestrial ecosystems and so the impacts of those threats	r pristine form and disturbed ome of the methods to eval	ecosystems at					

	Tutorial	s g / Self study			14 100
	Tutorial	c			1/
	Laboratory		laboratory & field work	24	
& Learning Activities	Lectures			24	
Course Teaching	Activiti	* *	Details	No. of Hours	
Course Type		with laboratory componer			
	1	of analytical and critical a problems. Organization and	bilities, logical and coherent thi I presentational skills are minima	inking. Show very little or no ability to ap	
	Fail	Show evidence of some of integration. Show limited at attention to thoughtful and r	coherent and logical thinking, bility to apply knowledge to solve eflective thinking.	us with limited analytical and critical ability problems. Apply limited effectiveness in pre-	ties and little attempt at esentational skills. Lack of
	C	outcomes. Show evidence familiar situations. Apply m thinking.	of some analytical and critical a oderately effective presentational	and skills required for attaining most abilities and logical thinking, and ability to a la skills. Little evidence of clear attention to d skills required for attaining some of the content of the conte	apply knowledge to most o thoughtful and reflective
	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning				
(A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking.				

BIOL3320	The biol	ogy of marine mammals (6 credits)	Academic Year	2017	
Offering Department	Biological	Sciences	Quota	30	
Course Co-ordinator	Dr L Karcz	zmarski, Biological Sciences (leszek@hku.hk)			
Teachers Involved	(Dr L Karc	zmarski,Biological Sciences)			
Course Objectives	and dolph mammals: (sirenians) environme	groups of animals have captured the public's imagina ins have. This course covers the evolutionary biology: whales, dolphins and porpoises (cetaceans), seals a) and sea otters. Students will learn to understand ent, their role in the marine ecosystem, their behaviou these animals in the human-dominated world.	r, ecology, behaviour, and conse and walruses (pinnipeds), manate the ecology of mammalian life	rvation of marine ees and dugongs e in the aquatic	
Course Contents & Topics	of the vari discusses highlightin followed to ranging be cognition, of human and a rev knowledge of marine discussion undertake	te begins with an overview of marine mammal species ious adaptations that have evolved to meet the challer the life history, reproductive strategies, ecology a g the similarities and differences between species in the sy sessions on behaviour and behavioural ecology; ehaviour, foraging strategies, ecology of group living and social strategies that guide the daily lives of these influences on the fate of marine mammals, examples riew of conservation and management strategies; our er of population ecology, behaviour and behavioural ecomammal populations. This course is designed for 3 me of current scientific research, innovative research independent literature-searches and will discuss their onceptual and analytical approaches to science.	nges of the marine environment. and population dynamics of m his taxonomically diverse group of here we discuss animal mover g and social behaviour, behavio e animals. The course concludes of critically endangered species or emphasis is on the importance ology in ensuring long-term effect and 4th year students; it income	Next, the course arine mammals, of animals. This is ment, diving and bural complexity, with a discussion and populations, of applying the titve conservation cludes field trips, les. Students will	
Course Learning Outcomes	CLO 1 ap CLO 2 un ec	esful completion of this course, students should be able operciate marine mammal diversity and biogeography inderstand how mammals adapt and function in an accessitem.	quatic environment and their ro		
	CLO 3 understand and appreciate the complexity of interactions between environmental selective pressures and marine mammal behaviour, population structure and demography				
	CLO 4 appreciate the socio-ecological diversity and behavioural complexity of marine mammals  CLO 5 think analytically in terms of marine mammal ecology and anthropogenic impacts in the rapidly changing world				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2306				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2019 : N	Examination	Dec	
Grade Descriptors (A+ to F)	A	Evidence of a thorough grasp of the subject in a broader compara excellent use of named examples and case studies. Evidence of ir of fundamental concepts to draw insightful and logical conclusions effective presentation skills with excellent analytical argumentation degree level.	ndependent critical thought with excellent . Show eagerness to learn, great abilities	use of a broad range of independent work,	
	В	Evidence of a good grasp of the subject as demonstrated by some and some case studies. Evidence of good critical thought, althous outstanding) abilities of independent work, effective presentation	ough not necessarily original. Good and	I very good (but not	

		general command of acquired knowledge to draw meaningful and logical conclusions. Work more than sufficient for where required at degree level.					
	С	of named examples and case studies. Some abilities of logical critical thinking, but not insightful and/or abilities to use acquired knowledge and work independently to draw meaningful conclusions. Fair pres- correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for w level.					
	D	studies. Insufficient evidence	e of background reading, limited abilities erally weak logical argumentation and	of critical independent thinking, and	not particularly effective		
	Fail	familiarity with any relevant of	num knowledge and understanding of examples and case studies. Inadequate in and no abilities to draw meaningful co	evidence of coherent logical thought;	ineffective presentation		
Course Type	Lecture w	ith laboratory componen	t course				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laboratory		including field trips, research site vists, demonstration of research techniques, interactive classroom debates		32		
	Project work		project work review		8		
	Reading / Self study			60			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		including active participation/continuous assessment/presentation	55	CLO 1,2,3,4,5		
	Examinat	tion		45	CLO 1,2,3,4,5		
Required/recommended		` ,	biology: An evolutionary approa	,			
reading and online materials	Perrin WF	Reynolds JE & Rommel SA (eds). Biology of marine mammals (Smithsonian Institution Press 1999) Perrin WF, Wursig B & Thewissen JGM (eds). Encyclopedia of marine mammals (Academic Press 2008)  Mann J, Connor RC, Tyack PL & Whitehead H (eds). Cetacean societies (The University of Chicago Press 2000)					
Course Website		v.biosch.hku.hk/ecology/	` '	( : : : : : · · · · · · · · · · · · · ·	5		
Additional Course		se is offered in alternate					
Information	This cours	his course will be offered subject to a minimum enrollment number and availability of teachers.					

BIOL3322	Marine invertebrate zoology (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota	30			
Course Co-ordinator	Dr S Cannicci, Biological Sciences (cannicci@hku.hk)					
Teachers Involved	(Dr S Cannicci, Biological Sciences)					
Course Objectives	This course introduces the students to the diversity, biology and ecology of marine invertebrates. Students will be introduced to various aspects of the systematics, anatomy, physiology and functional ecology of the major phyla of marine invertebrates to appreciate the diversity of body plans and ecological roles these animals play in costal, benthic and pelagic ecosystems. The course will particularly focus on the South East Asian seas, which are the most diverse marine systems in the world.					
Course Contents & Topics	Invertebrates make up 95% of all animal species. While insects domi environments have a much broader phyletic diversity, with taxa such as worms), Coelenterata (corals and sea anemones) and Echinoderms (sea the seas. Together with marine molluscs and crustaceans, these groups of all marine ecosystems, and are a fundamental focus of evolutionary relatives.  This course will lead the students through the discovery of the amazi structure and function of marine invertebrates. In the first part of the relationships and the body plans of marine invertebrates groups, tog pathways, will be described to provide students with an evolutionary grant students will learn the mechanisms underpinning the ecological functions of the functional biology and ecology of the dominant groups. The diversi Asian seas will be introduced, and students will become familiar the comfield trips and laboratory sessions.	Porifera (sponges), Pol- urchins and starfish) er play fundamental roles v studies of extant taxa- ting variety of body pla course, the study of ether with the associa d tour of life on Earth. In of marine ecosystems, ty of invertebrates prese	ychaetes (marine trirely confined to in the functioning and their fossil ans, adaptations, the phylogenetic ted evolutionary the second part, through the studyent in South East			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 identify major taxa of marine invertebrates					
	CLO 2 describe the evolutionary history of the different taxa , understanding their relationships					
	CLO 3 describe the composition of the invertebrates communities and their roles in marine ecosystems, and learn					
	to identify common species and taxa typical of Hong Kong coastal waters					
	CLO 4 understand the functional biology of marine invertebrates and their contribution to ecological functioning of marine ecosystems					
Pre-requisites	Pass in BIOL2306					
(and Co-requisites and Impermissible combinations)						
Offer in 2017 - 2018	Y 2nd sem Offer in 2018 - 2019 : N	Examination	May			
Grade Descriptors (A+ to F)	A Evidence of a thorough grasp of the subject and relevant research techniques familiarity with relevant background reading and case studies. Exemplary hand skills. Ample evidence of independent critical thought with excellent use of a lacomparative perspective to draw insightful and logical conclusions. Show of presentation skills with excellent analytical argumentation. Excellent or outstallevel.	dling of field data collection an broad range of fundamental outstanding abilities of independent	o learn and excellent d excellent analytical oncepts and broader dent work, effective			
	B Evidence of a good grasp of the subject and relevant research techniques. In with relevant background reading and case studies. Good handling of field of Good evidence of critical thought (although not always independent), with a consideration of broader comparative perspective in drawing logical conclusion presentation skills with logical and analytical argumentation. Work more than s	data collection and commend an appreciable use of fundar ons. Good abilities of indepe	able analytical skills. nental concepts and ndent work, effective			
	C Demonstrate an adequate, but incomplete grasp of the subject and relevan relevant background reading and case studies, but no interest in learning beyon					

	D Fail	critical thinking (although not always independent), with mostly good use of fundamental concepts to draw logical conc Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts sufficient for what is required for degree level.  Demonstrate some grasp of the subject, but only partial and with limited understanding of relevant research concepts search techniques. Some familiarity with relevant case studies, but insufficient evidence of background reading and abilities of critical independent thinking. Ineffective presentation skills with generally weak logical argumentation with reabilities of drawing appropriate conclusions. Work barely meets what is required at degree level.  No evidence of basic a minimum grasp of the subject and the minimum relevant research techniques. No evide background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work				
Course Type	Lecture wi	reach degree level. ith laboratory componen	t course			
Course Teaching	Activities	, , , , , , , , , , , , , , , , , , ,	Details			No. of Hours
& Learning Activities	Lectures					26
	Laboratory					24
	Field work					12
	Project work					12
	Reading / Self study					100
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments				30	CLO 2,4
	Examinat	ion			50	CLO 1,2,4
	Laborator	ry reports			20	CLO 1,3
Required/recommended reading and online materials	The Invert Ruppert, E 2004. Belr	R. S. K. Barnes, Peter P. Calow, P. J. W. Olive, D. W. Golding, J. I. Spicer. 2001  The Invertebrates: A Synthesis, 3rd Edition, Wiley-Blackwell.  Ruppert, Edward E.; Fox, Richard S.; Barnes, Robert D. Invertebrate Zoology: A Functional Evolutionary Approach.  2004. Belmont, CA: Thomas-Brooks/Cole.  Students will be directed to relevant scientific literature and websites				
Course Website	http://www	v.biosch.hku.hk/ecology/	lsc/			
Additional Course Information	Offer in all	ternate year from 2017-2 se will be offered subject	2018.	ment number and	availability of teachers	3

BIOL3328	Nearsho	ore marine and estuarine ecology (6 credits)	Academic Year	2017			
Offering Department	Biological		Quota	10			
Course Co-ordinator	Prof. G.A.	Williams, Biological Sciences (hrsbwga@hku.hk)	'				
Teachers Involved	(Prof. G.A	. Williams, School of Biological sciences)					
Course Objectives	relevant e communiti This will b	omparative approach between Hong Kong and South African servironmental gradients which define the intertidal zone, and the ies.  The achieved through an intensive field-based approach, visiting a residential fieldcamp, in South Africa.	e species interactions w	hich mould these			
Course Contents & Topics	residential (1) Intertid (2) Specie (3) Specie (4) Trophi (5) Larger HKU Stud South Afri reports on	Students will learn the abiotic and biotic factors that structure intertidal communities in Hong Kong and, during a residential fieldcamp, different South African intertidal communities. In South Africa, specific topics will focus on (1) Intertidal biodiversity and species interactions (2) Species distribution patterns on intertidal shores (3) Species interactions and behaviour (4) Trophic interactions and connectivity between local terrestrial and marine communities. (5) Larger-scale connectivity from freshwaters to marine systems HKU Students will work in groups with students from the University of Johannesburg and North West University. South Africa to collect data; design and carry out experiments; present their findings; and write up formal scientific reports on the different topics.  Note individual topics may change in different years and are weather dependent.					
Course Learning		ssful completion of this course, students should be able to:					
Outcomes	CLO 1 compare the contrast the shallow water coastal environments of Hong Kong and the Eastern Cape Province of South Africa CLO 2 identify a range of species and their roles and relationships in the intertidal zone CLO 3 understand the abiotic conditions defining the intertidal environment and quantify and interpret the distribution of species over relevant environmental gradients CLO 4 design, execute and analyse experiments to investigate species interactions CLO 5 integrate abiotic and biotic interactions to determine patterns of connectivity between intertidal habitats						
	CLO 6 analyse, interpret and present data using a variety of media to demonstrate scientific understanding of topics						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	OL2306 or BIOL3301					
Offer in 2017 - 2018	Y 2nd	I sem Offer in 2018 - 2019 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	A	Thorough and complete grasp of the subject. Strong analytical and critical ab thought. Excellent lab / fieldwork skills and techniques. Critical use of dat conclusions. Excellent organizational and presentational skills	oilities and logical thinking, with ta and results to draw appro	n evidence of origina priate and insightfu			
	В	Good and near-complete grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Co fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Good organ					
		presentational skills.	ppropriate conclusions. Good				
	С	presentational skills.  Adequate (but incomplete) grasp of the subject. Evidence of some analytical lab / fieldwork skills and techniques. Mostly correct but some erroneous use of Fair organizational and presentational skills.	and critical abilities and logic of data and results to draw app	organizational and al thinking. Adequate propriate conclusions			
	C D	presentational skills.  Adequate (but incomplete) grasp of the subject. Evidence of some analytical lab / fieldwork skills and techniques. Mostly correct but some erroneous use of Fair organizational and presentational skills.  Limited grasp, with retention of some relevant information, of the subject. Evidence in the subject of the subject is the subject is the subject in the subject is the s	and critical abilities and logic f data and results to draw app vidence of some coherent and ills and techniques. Limited al presentational skills.	organizational and al thinking. Adequate propriate conclusions I logical thinking, bu bility to use data and			
		presentational skills.  Adequate (but incomplete) grasp of the subject. Evidence of some analytical lab / fieldwork skills and techniques. Mostly correct but some erroneous use c Fair organizational and presentational skills.  Limited grasp, with retention of some relevant information, of the subject. Evith limited analytical and critical abilities. Barely adequate lab / fieldwork sk	and critical abilities and logic of data and results to draw approvidence of some coherent and ills and techniques. Limited all d presentational skills. nalytical and critical abilities,	I organizational and al thinking. Adequat- propriate conclusions I logical thinking, bubility to use data and logical and coheren			

Course Teaching	Activities	Details	Details				
& Learning Activities	Lectures	Pre-course modules		8			
	Field work			60			
	Tutorials	Pre-course assignments		10			
	Reading / Self study			50			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments	Group presentation	20	CLO 3,4,5,6			
	Report		70	CLO 1,2,3,4,5,6			
	Test	Pre-course	10	CLO 1,2,6			
Required/recommended reading and online materials	Students will be directed to	students will be directed to relevant scientific literature, websites and appropriate teaching materials.					
Course Website	http://www.biosch.hku.hk/ed	cology/lsc/					
Additional Course Information	Students will join undergra South Africa on a residentia second Reading Week (S contribute to daily camp act	IOL3318 will be at an advantage. Iduate students from the University. I field camp at Tsitsikamma (Storms econd Semester). Students will be it it is as well as conduct fieldwork a course, which may include airfares of South African hosts.	s River Camp, Eastern Province e expected to live in tented a in potentially harsh environmer	s, South Africa) in the accommodation and stal conditions. Extra			

BIOL3401	Molecu	lar biology (6 cred	dits)	Academic Ye	ear 2017		
Offering Department		l Sciences	•	Quota	130		
Course Co-ordinator	Prof. B K	C Chow, Biological S	Sciences (bkcc@hku.hk)				
Teachers Involved	(Dr K W \	Chan,Biological Sciend Y Yuen,Biological Science C Chow,Biological Science	ences)				
Course Objectives	To provid		ent knowledge in molecular biology	with special emphasis or	the study of gen		
Course Contents & Topics	replication regulation oligonucle	The course includes a detailed account of the molecular processes in eukaryotic and prokaryotic cells, from DNA replication, RNA transcription, protein translation, to post-translational modifications with special emphasis on the regulation of prokaryotic and eukaryotic gene expression. Recently developed biochemical techniques including oligonucleotide synthesis, DNA sequencing, complementary screening and DNA cloning, site-directed mutagenesis, polymerase chain reaction and transgenic technology will also be discussed.					
Course Learning Outcomes	CLO 1 ki	now the basic structu ells	nis course, students should be able to res of DNA, RNA and protein, and ho	ow DNA is package in the r	•		
	tr	anslational modification	emical processes involved in DNA ons in prokaryotes and eukaryotes		•		
			ne regulation of gene transcription in				
			ge and understanding of the underlyin CR, site-directed mutagenesis, DNA	0 1	recently develope		
Pre-requisites		ass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301					
(and Co-requisites and Impermissible combinations)	rass III b	Pass in BIOC2600 of BIOL2103 of BIOL2220 of MEDE2301					
Offer in 2017 - 2018	Y 1st	t sem Offer in 2018	- 2019 : Y	Examination	Dec		
Grade Descriptors	Α		mastery at an advanced level of extensive	knowledge required for attaining	all the course learnin		
, ,	knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective lab skills and techniques. Cr use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentati skills.  B Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course lear outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar some unfamiliar situations. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Several evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations.				tional and presentation st of the course learnin nowledge to familiar ar ults to draw appropriat learning outcomes. Sho		
	Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D	D Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriat conclusions. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture w	vith laboratory compo	nent course				
Course Teaching	Activitie		Details		No. of Hours		
Learning Activities	Lectures						
	Laborato						
	Tutorials				6		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Assignm	ents	assessment of practical work	20	CLO 1,2,4		
	Examina	tion		80	CLO 1,2,3,4		
Required/recommended reading and	Examina R. Weave	tion er: Molecular Biology	(McGraw-Hill, 2005 or 2008) llogy of the Gene (Benjamin Cumming	80			

online materials	B. Lewin: Gene IX (Jones and Bertlett, 2008) Selected journal articles and web learning materials. TBC
Course Website	http://moodle.hku.hk/

BIOL3402	Cell biol	ogy and cell tech	nology (6 credits)	Academic Year	2017		
Offering Department	Biological		,	Quota	120		
Course Co-ordinator			iences (awong1@hku.hk)	, ·			
Teachers Involved		Tsang,Biological Scie					
		ui,Biological Sciences Γ Wong,Biological Sci					
Course Objectives			anding of the structure and function in biology and biotechnology	of cells, and the principles a	and applications o		
Course Contents	I. Cell Biol	ogy	<u> </u>				
& Topics		potentials, Action	Cellular transport: ions transport an potentials. Cell junctions. Extracell				
	Mammalia formulation cryoprese	n, growth factors and rvation.	rimary and continuous cell lines. C I design of serum-free media. Cultui				
		ques in plant cell cultu shoot cultures. Explar	nt regeneration. Protoplasts. Seconda	arv metabolites			
Course Learning		·	s course, students should be able to:	•			
Outcomes	CLO 1	· · · · · · · · · · · · · · · · · · ·	I knowledge on cell biology and cell t				
	CLO 2	· ·	aboratory techniques on cell culture	ooo.gy			
	CLO 3 gain insight into real-life applications in cell biology and cell technology						
Pre-requisites		s in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301					
(and Co-requisites and Impermissible combinations)							
Offer in 2017 - 2018	Y 1st	1st sem Offer in 2018 - 2019 : Y Examination Dec					
Grade Descriptors	A Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course lear						
(A+ to F)	outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational skills. Writings consistently demonstrate informed, thoughtful intellectual engagement with broad range of relevant concepts.						
	В	outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills. Writings mostly demonstrate informed, thoughtful intellectual engagement with broad range of relevant concepts.					
	С	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills. Writings mostly indicate informed, intellectual engagement with concepts or theories but not always with sufficient depth, breadth or understanding.					
	D						
	Fail  Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.  Organizational skills are minimally effective or ineffective. Writings reveal an absence of intellectual engagement with concepts or theories. Writings are irrelevant or superficial.						
Course Type	Lecture wi	th laboratory compon	·				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborator	y			24		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts	assessment of practical work	30	CLO 1,2,3		
	Examinat	on		70	CLO 1,3		
Required/recommended reading and online materials	Mather, J.	et al.: Molecular Biol P.: Introduction to Ce	ogy of the Cell (Garland, 2014, 6th e ell and Tissue Culture, Theory and Te Plant Cell Culture (Oxford: Bios Scier	echniques (Plenum, 1998)			
	Reference TBC						
Course Website	http://moo	//moodle.hku.hk/					

BIOL3403	Immunology (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	100
Course Co-ordinator	Prof W W M Lee, Biological Sciences (hrszlwm@hku.hk)		
Teachers Involved	(Dr W B L Lim,Biological Sciences) (Prof W W M Lee,Biological Sciences)		
Course Objectives	To provide a broad understanding of the animal immune system. Topics will variety of immunological methods to research and disease diagnosis.	also include the	application of a
Course Contents	Immunological functions in the vertebrates and analogous activities in inverte	ebrates. Structure	s and biologica

& Topics	of lympho and para	operties of immunoglobulins and T-cell receptors. Divergence of antibody genes. Emergence and characteristic lymphoid tissues. Major histocompatibility complex. Complement pathways. Immunity against bacteria, viruses d parasites. AIDS, Vaccination, hypersensitivity, and autoimmunity. Immunological tests and immunochemical chniques using non mammalian and mammalian antibodies and their application to various biological problems.					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe the structure and function of the immune molecules which are involved in the body defense mechanisms, including antibody, T-cell receptor, cytokines, MHC and complement proteins  CLO 2 describe the organization of the mammalian immune system in terms of genes, cells and tissues  CLO 3 explain the underlying mechanisms associated with transplant rejection, transfusion reaction and vaccination  CLO 4 explain how the immune system responds to infections by bacteria, viruses and parasites						
	CLO 4 e	explain how the immune	e system responds to infection body interaction and the prince		tes		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	s in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301					
Offer in 2017 - 2018	Y 2n	Ind sem Offer in 2018 - 2019 : Y					
<b>Grade Descriptors</b>	Α			ensive understanding of the subject matt			
(A+ to F)	analysis into the scientific literatures. 3. Superior writing, presentation and group communication skills.						
	<ol> <li>Good performance demonstrating full understanding of the subject matter.</li> <li>Coherent insight and analysis into the scientific literatures.</li> <li>Good writing, presentation and group communication skills.</li> </ol>						
	1. Satisfactory performance demonstrating adequate understanding of the subject matter. 2. Some insight into the scientific						
	literatures. 3. Adequate writing and communication skills.						
	D	<ol> <li>Limited performance demonstrating some understanding of basic subject matter. 2. Some ability to use the scientific literatures. 3.Limited writing and communication skills.</li> </ol>					
	Fail	·					
Course Type	Lecture v	vith laboratory compon	ent course				
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures	}			30		
	Laborato	ory	during reading week		16		
	Tutorials	•			6		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examina	ation		80	CLO 1,2,3,4,5		
	Laborato	ory reports		20	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Benjamin	n & Leskowitz: Immuno	and Company, 2003 or 2007 logy: A Short Course (Wiley-I Immunology (Mosby, latest 2	Liss, 2007, 6th edition. Or the late	est edition)		
Course Website		odle.hku.hk/	<del>-</del> - · · · -	·			
Additional Course Information	This cour	rse will be offered subje	ect to a minimum enrollment r	number and availability of teacher	S.		

BIOL3405	Molecula	ar microbiology (6 credits)	Academic Yea	r 2017			
Offering Department	Biological	Sciences	Quota	30			
Course Co-ordinator	, Biologi	, Biological Sciences ()					
Teachers Involved	(,Biologi	(,Biological Sciences)					
Course Objectives	modern fu	This course is intended for biology, biotechnology and biochemistry students who would like to understand the modern fundamentals of microbiology. At the end of the course the students are expected to know the physiological, biochemical and molecular aspects of microbiology.					
Course Contents & Topics	in the envi changes a considered	The basic biochemistry of microorganisms will be described. The intrinsic factors that affect the growth of microbes in the environment will be examined. The adaptation of the microbes to the environment by means of physiological changes and genetical alterations will be illustrated. The molecular biology of bacteria and viruses will be considered. The molecular biology of plasmids and transposable elements and their association with medical aspect will be discussed. The use of modern technology in studying microorganisms will be explored.					
Course Learning		ssful completion of this course, students should be					
Outcomes	CLO 1 u	inderstand the intrinsic reorganization of microbes	s in response to the changing environ	ments			
	CLO 2 comprehend the major modes of regulation in the microbe						
	CLO 3 explain the biology of bacteriophages and plasmids						
	CLO 4 realize the importance of transposable elements in the survival of the microbes						
	CLO 5 appreciate the development of modern techniques in studying microorganisms						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	OL2103					
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N	Examination				
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Demonstrate substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills						
	appropriate conclusions. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						

	Demonstrate evidence analytical and critical	strate little or no evidence of command of knowledge and skills required for attaining the course learning out strate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or al and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab skills and tech of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are m or ineffective.					
Course Type	Lecture with laboratory compo	e with laboratory component course					
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Lectures			24			
	Laboratory			20			
	Tutorials			6			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examination		70	CLO 1,2,3,4			
	Laboratory reports		20	CLO 3,4,5			
	Presentation		10	CLO 1,2,5			
Required/recommended reading and online materials	Willey, Sherwood & Woolverto Watson, Baker, Bell, Gann, Le	BC aloy S.R., Cronan J.E. & Freifelder D. Microbial Genetics (Jones & Bartlett 1994, 2nd ed.) illey, Sherwood & Woolverton: Prescott's Principles of Microbiology (McGraw Hill 2009) atson, Baker, Bell, Gann, Levine & Losick: Molecular Biology of the Gene (CSHL Press 2008, 6th ed.) adigan, Martinko, Dunlap & Clark: Brock Biology of Microorganisms (Pearson 2009, 12th ed.)					
Course Website	http://moodle.hku.hk/		-				
Additional Course Information	This course will be offered sul	oject to a minimum enrollme	ent number and availability of teachers	<b>)</b> .			

BIOL3406	Reprodu	uction and reproduct	tive biotechnology (6 credits)	Academic Year	2017		
Offering Department	Biological	Sciences		Quota	40		
Course Co-ordinator	Prof A O I	L Wong, Biological Science	ces (olwong@hku.hk)				
eachers Involved	(Prof A O	L Wong, Biological Scien	ces)				
Course Objectives		To provide a comprehensive overview on modern concepts and recent advances in reproductive biology & reproductive biotechnology in human and animal models.					
Course Contents	-Basic cor	-Basic concepts of reproduction, evolution of sex, human & animal reproductive strategies and sexual behavior.					
& Topics	-Neuroend feedback -Environm reproducti -Recent a medicine/ -New tech	-Molecular mechanisms for sex determination, developmental aspects of gametogenesis and reproductive systemsNeuroendocrinology of reproductive system and recent advances in kisspeptin & GnRH system and steroid feedback via KNDy neuronal circuitEnvironmental endocrine disruptors and recent advances in biotechnology for fertility control & assisted reproduction in humanRecent advances in embryonic stem cells & induced pluripotent stem cells and their applications in regenerative medicine/therapeutic cloningNew technology for genome editing by TALENT & CRISPR/Cas9 systems and gene therapy, animal cloning and					
Yourse Learning	-	I germ cell transplantation	ourse, students should be able to:				
Course Learning Outcomes	CLO 1 Ha	ave a broad understandi	ng of reproductive biology ranging from aviors in animals to the regulatory m				
	CLO 2 Have an appreciation of the recent advances on neuroendocrine control of reproductive functions & reproductive cycle, sexual behavior, parental care, and pregnancy & parturition in human & mammalian models.						
	CLO 3 Have a basic understanding on the adverse effects of environmental endocrine disruptors on reproduction, possible causes of human infertility & treatment with assisted reproduction.  CLO 4 Comprehend a wide range of modern technologies for genome editing, animal cloning & primordial germ cell transplantation and the applications of embryonic stem cells/induced pluripotent stem cells in regenerative medicine/therapeutic cloning.						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	IOL2103 or BIOL2220or	BIOC2600				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	19 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	outcomes. Show strong anal knowledge to a wide range of	ery at an advanced level of extensive knowledg ytical and critical abilities and logical thinking, with if complex, familiar and unfamiliar situations. Apply raw appropriate and insightful conclusions. Apply h	evidence of original though highly effective lab skills ar	nt, and ability to apply and techniques. Critica		
	В	B Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture w	Lecture with laboratory component course					
	Activities		Details		No of House		
•	ACTIVITIES	<b>3</b>	Details		No. of Hours		
Course Teaching & Learning Activities	Lectures		Details		No. of Hours		

	Tutorials			6	
	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examination		70	CLO 1,2,3,4	
	Laboratory reports		15	CLO 2,3,4	
	Test	Test & Continuous Assessment	15	CLO 1,2,3,4	
Required/recommended reading and online materials	<ol> <li>Biotechnology of Animal Reproduction (e-book) by M. M. Seneda, K. C. Silva-Santos &amp; L. S. R. Martinho, Nova Science Publishers (2016).</li> <li>Human Reproductive Biology (4th edition, e-Book) by R.E. Jones &amp; Kristin H. Lopez, Academic Press (2015) (Winner of 2015 Textbook Excellence Award).</li> <li>Reproduction System at a Glance by L.J. Heffner &amp; D.J. Schust, Wiley-Blackwell (2014).</li> <li>Yen and Jaffe Reproductive Endocrinology (e-Book) by J.F. Strauss III &amp; R. Barbieri, Elsevier / Saunders (2014)</li> </ol>				
Course Website	http://moodle.hku.hk/				
Additional Course Information	Refer to the Website of School of This course will be offered subject	Biological Sciences et to a minimum enrollment number a	and availability of teachers		

BIOL3408	Genetic	s (6 credits)		Academic Yea	ar 2017		
Offering Department	Biological	Sciences		Quota	50		
Course Co-ordinator	Dr C S C	Lo, Biological Science	ces (clivelo@hku.hk)				
Teachers Involved	(Dr C S C	Lo, Biological Scien	ce)				
	(Dr J Zhang,Biological Sciences)						
Course Objectives		This course aims to provide students with fundamental knowledge of classical, molecular and population genetics					
Course Contents & Topics	and map recombinate genetics.	Topics will include cellular reproduction, principles and chromosomal basis of Mendelian genetics, linkage analysis and mapping, concept and definition of the gene, molecular mechanisms of mutation, DNA repair and recombination, DNA transposition, extranuclear inheritance, developmental genetics, quantitative and population genetics. Students are strongly encouraged to take BIOL2303 Molecular Biology to get a more comprehensive coverage of topics in molecular genetics.					
Course Learning			his course, students should be able to:				
Outcomes			of genetic organizations in nature				
			principles to explain hereditary traits obs	erved in nature and labora	tories		
	CLO 3 ap		quantitative experimental methodolog				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	Pass in BIOL2103					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018	3 - 2019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Integration of the full range of appropriate theories, principles, evidence and techniques						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. General integration of theories, principles, evidence and techniques					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Some partial integration of theories, principles, evidence and techniques					
	D						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Little or no or inapt integration of theories, principles, evidence and techniques						
Course Type	Lecture w	ith laboratory compo	onent course				
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborato	ry			24		
	Tutorials		tutorials & laboratories	tutorials & laboratories			
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	laboratory reports, assignments	30	CLO 1,2,3		
	Examinat			70	CLO 1,2,3		
Course Website	http://mod	dle.hku.hk/					
Additional Course Information			oject to a minimum enrollment number a	nd availability of teachers.			

BIOL3409	Business aspects of biotechnology (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota	40			
Course Co-ordinator	Dr W B L Lim, Biological Sciences (bllim@hku.hk)					
Teachers Involved	(Dr W B L Lim, Biological Science)					
Course Objectives	The course will give an overview of the innovative developments in biotech industry and provide the students with useful tools in learning how an exciting research idea can be turned into a viable business.					
Course Contents & Topics	The purpose of the course is to introduce you to the entrepreneurial process industry. The course will provide a thoughtful, practical guide to the proceentrepreneurial venture. We place a special emphasis on the decision to become to develop successful business ideas, however we will also discuss the processor firm. Topics on intellectual properties, patent laws, patent application processor.	ess of successful ne a biotech entre cess of moving fr	lly launching an epreneur and how om an idea to a			

		iority will be given to students majoring or minoring in MBB				
Additional Course			iect to a minimum enrollmen	nt number and availability of teacher	S.	
online materials  Course Website	Online ma	annual reports aterials odle.hku.hk/				
reading and	McGraw I	Hill	Jon, Andrew J. Neison (201	T) Toolinology ventures. Profit lues	i to Enterprise siù et	
Required/recommended	Test	J Dyore Dichard C F	Oorf Androw I Nolcon (201	1) Technology Ventures: From Idea	CLO 1,2,3,4,5	
	Presenta	tion		20	CLO 1,2,3,4,5	
	Assignme			60	CLO 1,2,3,4,5	
and Weighting	Wethous		Details	course grade (%)	Assessment Methods to CLO Mapping	
Assessment Methods	Methods		Details			
	Assessm	•	Assignment		60 18	
		/ Self study	rieschiallon	i rescritation		
	Group wo		Presentation	Presentation		
Leaning Activities	Lectures Field wor				36	
Course Teaching & Learning Activities	Activities		Details		No. of Hours	
Course Type		ased course	Deteile		Na efile	
	Fail		trate a moderate understanding of t	the current developments in biotechnology in	idustry.	
	Students demonstrate a moderate understanding of the current developments in biotechnology industry.					
	C Students demonstrate a broad and in-depth understanding of the current developments in biotechnology industry.					
(A+ to F)	technological developments of various biotechnology ventures.  B Students demonstrate a broad and in-depth understanding of the current developments in biotechnology industry and are capable of analyzing the business and technological developments of various biotechnology ventures under guidance.					
Grade Descriptors	A 2110			e course and are capable of independently a		
Pre-requisites and Co-requisites and Impermissible combinations) Offer in 2017 - 2018		ny level 3 BIOL or BIO		Examination	No Exam	
		· · · · · · · · · · · · · · · · · · ·	ute to the business side of so	cientific enterprises		
	CLO 4 ga	ain technical and busi		echnology and bioprocessing indust	ries	
		avigate the various ste market	eps in the development of a	biotechnology derived product: from	n bench, to scale-up	
				inventions are commercialized	James San Carlo	
Course Learning Outcomes		•	is course, students should bustrate knowledge of the dev	be able to: /elopment and management of biote	echnology business	
Course Loove:	11. Company analysis					
	<ol><li>Compa</li><li>Comp</li></ol>	any analysis (3 hours) pany Visit				
			al trials (Gilead Sciences, V Diagcor, etc) (4.5 hours)	Vuxi PharmaTech, etc). (6 hours)		
	6. Agrobio	otechnology and Gree	en Tech (Monsanto, Novozy			
			and HKSTP (3 hours) companies (3 hours)?			
		ng of IP rights (3 hour				
			Patent system, USPTO, SIF			
	Topics:	ction to Riotechnology	y Industry: 4 P in Biotechnol	logy Rusiness (3 hours)		
	will be presenting case studies and explain their involvement in various biotech and pharmaceutical companies.					
	be covered as well. Throughout the course, guest entrepreneurs, managers and directors of the biotech industry					

BIOL3419	Insect ecology: the little things that run the world (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota	25			
Course Co-ordinator	Dr B Guenard, Biological Sciences (bguenard@hku.hk)					
Teachers Involved						
Course Objectives	This course introduces the students with the biology of terrestrial arthropods. With a main focus on insects and arachnids, students will be introduced to various aspects of their anatomy and physiology, systematics, and ecology to understand the fundamental roles that arthropods play in natural and human-shaped ecosystems. The course will focus particularly on the diversity and importance of insects in South Fast Asia					
Course Contents & Topics	course will focus particularly on the diversity and importance of insects in South East Asia.  With about 1.1 million and 110,000 species described respectively, insects and arachnids represent nearly 80% of all species known on the planet. A diversity also reflected in the diversity of behaviours, evolutionary adaptations or ecological interactions played at all trophic levels within ecosystems. As herbivores, pollinators, seed-dispersal agents, predators, parasitoids, disease vectors or decomposers, arthropods are major components in the stability and functioning of most ecosystems. Yet their importance is often underestimated by many fields of biology to the profit of larger "charismatic" vertebrates. However, arthropods offer incredible opportunities for scientific discoveries, revealing sometimes attributes in morphology, reproduction or behaviour beyond the most prolific imagination, and challenging existing paradigms in ecology and evolution.  This course will propose an introduction to these extremely successful organisms and give them the value they deserve. A first step to the study of arthropods is to learn how to identify them correctly. Part of this course will present the main criteria to recognize major insects and arachnida groups. The second part will focus on their diversity, distribution and ecological functions within ecosystems. Finally the last part of the course will present the impacts of human activities on arthropods, how they have been used historically and nowadays, and what kind of					
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 identify major groups of insects and arthropods CLO 2 understand and use the main collecting methods to sample arthropod CLO 3 understand the ecological diversity of arthropod groups and their important contents.		ns			

	CLO 4	understand the biotic and	d abiotic factors that drive terrestria	al arthropod species richnes	s and abundance	
			activities modify insect diversity	· · · · ·		
	CLO 6	describe the multiple role	es played by insects on human act	ivities		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	Pass in BIOL1309 and BIOL2306				
Offer in 2017 - 2018	N C	Offer in 2018 - 2019 : Y		Examination		
Grade Descriptors (A+ to F)	A	identification skills and use	Ilent understanding of the biological conce e of taxonomic keys of the different group and identification of the collection reaching	s of arthropods studied. Present ar	active and participative	
	В	identification skills and use	understanding of the biological concepts are of taxonomic keys of the different groups llection satisfactory for the course.			
	С					
	D					
	Fail to provide evidence of knowledge on the biological concepts and theories developed during the course. No identification skills and lack of knowledge on how to use taxonomic keys. No participation in class or unsettling. Curation and identification highly unsatisfactory or work not delivered on time.					
Course Type	Lecture	with laboratory compone	nt course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lecture	es .			24	
	Laboratory		and curation of arthropod collect	This part includes 4 hours of lectures about identification and curation of arthropod collection.		
	Project work		Students will collect independently their own insect collection, curate and identify the specimen collected		48	
	Readin	g / Self study			50	
Assessment Methods and Weighting	Method	ds	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignr	ments		30	CLO 1,2,3,5,6	
	Examination			40	CLO 1,2,3,4,5,6	
	Laboratory reports			30	CLO 1,2,3	
Required/recommended reading and conline materials	USA. 80	Price et al. 2011. Insect Ecology: behavior, populations and communities. Cambridge University Press, New York, USA. 801 pages. Schowalter T. D. 2011. Insect Ecology, an ecosystem approach. Elsevier, China. 633 pages.				
Course Website		ww.biosch.hku.hk/ecology	· · · · · · · · · · · · · · · · · · ·	,		
Additional Course	Offer in	ffer in alternate year from 2017-2018 his course will be offered subject to a minimum enrollment number and availability of teachers				

BIOL3501	Evolution (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota	50			
Course Co-ordinator	Dr M Sun, Biological Sciences (meisun@hku.hk)					
Teachers Involved						
Course Objectives	Evolution is the cornerstone of modern biology. The course aims to introduce students to the major themes of contemporary evolutionary biology, including the history of evolutionary biology, evolutionary processes adaptation, speciation, and evolution as an explanatory framework at all levels of biological organization.  The course emphasizes the interplay between theory and empirical tests of hypotheses, thus acquainting student with the process of science.					
Course Contents	Introduction to Evolution					
& Topics	- The relevance of evolution to everyday life - Cases for evolutionary thinking Evolution as Fact - Patterns of evolutionary change - The evidence for evolution Evolution as Theory - Before Darwin - Darwinism - The Modern Synthesis & beyond The Mechanisms of Evolution - The origin of genetic variation: mutation - Genetic drift: evolution at random Natural selection, sexual selection, and adaptation Migration Evolution and Biodiversity - Species - Speciation - Evolution and development - The history of life - Estimating Evolutionary Trees					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 familiar with the facts and theory of evolution					
	CLO 2 describe Darwin's theory of evolution by natural selection and how the process of natural selection can lead to speciation					
	CLO 3 have an advanced understanding of the modern evolutionary the	heory				
	CLO 4 apply evolutionary thinking to real world problems in agriculture		conservation			
Pre-requisites	Pass in BIOL2306					

(and Co-requisites and Impermissible						
combinations) Offer in 2017 - 2018	N O	ffer in 2018 - 2019 : N		Examination		
Grade Descriptors (A+ to F)	A					
	В	Good performance demons	strating capacity to use the appropria	ate concepts, a good understanding of the the subject, showing evidence of attain		
	С			he subject matter, an ability to handle re aining most of the expected course learr		
	D	Minimally acceptable perfor	mance demonstrating at least partial	I familiarity with the subject matter and s ciencies in knowledge required for attain	ome capacity to deal with	
	Fail	Poor performance in all as		evidence of learning, lacking real undeadvisable to proceed further without add		
Course Type	Lecture-l	based course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Project work				12	
	Reading / Self study				100	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents		10	CLO 1,2,3,4	
	Essay			5	CLO 1,2,3,4	
	Examina	ation		50	CLO 1,2,3,4	
	Presenta	ation		10	CLO 1,2,3,4	
	Project r	reports	including computer lab	15	CLO 1,2,3,4	
	Test	•	<u> </u>	10	CLO 1,2,3,4	
Required/recommended	J.C. Heri	ron and S. Freeman: Evo	lutionary Analysis (5th ed. Pe	earson, 2013)		
reading and online materials	Douglas	J. Futuyma: Evolution, (3	Brd Edition, Sinauer Associate			
		available.				
Course Website		odle.hku.hk/				
Additional Course Information	This cou	rse will be offered subjec	t to a minimum enrollment nu	mber and availability of teachers	S.	

BIOL3502	Conse	rvation genetics (6 credits)	Academic Year	2017			
Offering Department	Biologic	al Sciences	Quota	50			
Course Co-ordinator	Dr M Sı	ın, Biological Sciences (meisun@hku.hk)					
Teachers Involved							
Course Objectives	The course aims to familiarize students with fundamental principles and recent advances in conservation genetic. The theories and methods will be taught with a balanced range of examples - mammals, birds, reptiles amphibians, fish, invertebrates, as well as plants - to demonstrate how genetic data can be used to answer a range of important questions in real world conservation practice.						
Course Contents & Topics	Part I. E - geneti - charac - evoluti - geneti - mainte	ction to conservation genetics.  Evolutionary Genetics of Natural Populations: c diversity cterizing genetic diversity: single loci and quantitative variation; onary impacts of natural selection, mutation, migration and their inter c consequences of small population sizes; enance of genetic diversity; tion genomics.	actions in large popul	ations;			
	Part II. Effects of Population Size Reduction: - loss of genetic diversity in small populations; - inbreeding; - inbreeding depression; - population fragmentation; - genetically viable populations.  Part III. From Theory to Practice:						
	- resolving taxonomic uncertainties and defining management units;						
	- genetic management of wild populations;						
	- genetic issues in introduced and invasive species;						
	- genetic management of captive populations;						
	- genetic management for reintroduction;						
	- use of molecular genetics in forensics and understanding species biology.						
Course Learning		pessful completion of this course, students should be able to:					
Outcomes		demonstrate an advanced understanding of the concepts of conserva					
		understand the criteria for determining the conservation status of e species		e, or threatene			
		know the methods for characterizing genetic diversity at population a					
		comprehend the relationships between genetic diversity, inbreeding, potential in wild populations	reproductive fitness,	and evolutionar			
		describe the effects of habitat fragmentation and population size rimplications in managing nature reserves	eduction on genetic of	liversity and the			

		CLO 6 gain ability to integrate genetic information in resolving taxonomic uncertainties, in understanding species biology, in setting conservation priorities, and in developing management strategies for wild and captive populations					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	Pass in BIOL2306 or BIOL3303 or BIOL3408					
Offer in 2017 - 2018	N C	N Offer in 2018 - 2019 : N Examination					
Grade Descriptors (A+ to F)	A	range of topics covered	d by the course, and skillful app in critical thinking and logical r	t understanding of the subject matter, extensiv blications of concepts/theories in solving new reasoning, with evidence of significant insigh	or unfamiliar problems,		
	В	· · · · · · · · · · · · · · · · · · ·					
	С			ng of the subject matter, an ability to handle re for attaining most of the expected course learn			
	D						
	Fail  Poor performance in all aspects of the course, showing little evidence of learning, lacking real understa matter, demonstrating deficiencies serious enough to make it inadvisable to proceed further without additional process.						
Course Type	Lecture	with laboratory compor	nent course				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures						
	Laboratory				12		
	Project work				12		
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Method	is	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignr	ments		10	CLO 1,3,4,5,6		
	Essay			5	CLO 1,2,3,4,5		
	Examin	ation		50	CLO 1,4,5,6		
	Laborat	tory reports		10	CLO 3		
	Present	tation		10	CLO 1,4,5,6		
	Project	report		5	CLO 1,4,6		
	Test			10	CLO 1,4,5,6		
Required/recommended reading and online materials		am et al: Introduction to available	Conservation Genetics (Ca	ambridge University Press, 2009, 2nd	d ed.)		
Course Website	http://mo	oodle.hku.hk/					
Additional Course		e - to be listed					
Information			iect to a minimum enrollme	ent number and availability of teachers	s		

BIOL3503	Endocrinology: human physiology II (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota	60			
Course Co-ordinator	Dr C B Chan, Biological Sciences (chancb@hku.hk)					
Teachers Involved	(Dr C B Chan,Biological Sciences) (Prof A S T Wong,Biological Sciences) (Prof B K C Chow,Biological Sciences)					
Course Objectives	To provide an advanced course on hormones and how they regular water/salt homeostasis in our body.	te metabolism/growth, r	eproduction and			
Course Contents & Topics	History: discovery of blood borne factor or hormone. Chemical natural signaling. Secondary messengers. Responsivity and hormonal effects. The hypothalamic pituitary axis The GHRH-GH-IGF axis. The TRH-TSH-thyroid hormone axis. The CRICatecholamine effects and their pathways. The gastrointestinal system The enteric nervous system. The cephalic phase, stomach phase a Regulation of acid secretion. Regulation of pancreatic exocrine and end GIP, CCK, secretin, GLP-1, GLP-2 and motilin. Regulation of feeding, end Insulin and glucagon. Reproduction The GnRH-gonadotropin-sex hormone axis. Regulation of LH and Found Interaction of hormones produced by various cells in the testis to regulate testosterone. The erection reflex. Female reproductive system. Develog cycle: hormonal control: Ovulation, fertilization and implantation. The pla regulation of parturition. Hormonal control of milk secretion. Prolactin and Osmoregulation Posterior pituitary hormone, ADH. Aldosterone and sodium bal pressure. Atrial natriuretic peptide and its function in water and sodium bal	A-ACTH-cortisol axis. Co and intestinal phase of docrine secretion. Gut he ergy balance and food in SH release. Male repro te spermatogenesis. Bio oment of ovarian follicles acenta as an endocrine of broodiness.	food digestion from digestion from gastrin take. ductive system logical actions of s. The menstrua organ. Endocrino			
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand the definition and natures of hormones CLO 2 explain and describe secondary messenger pathways for hormones					
	CLO 3 describe the connection between pituitary the master gland with higher brain centers and peripheral organs CLO 4 explain and describe hormones involved in the regulation of 3 most important body functions including metabolism/growth, reproduction and water/salt homeostasis					
Pre-requisites (and Co-requisites and Impermissible	Pass in BIOL2103					

Offer in 2017 - 2018	Y 2nd	d sem Offer in 2018 -	· 2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational skills.				
	В	outcomes. Show evidence	command of a broad range of knowledge e of analytical and critical abilities and log s. Apply effective organizational skills.			
	С		incomplete command of knowledge requir cal and critical abilities and logical thinkin e organizational skills.			
	D	evidence of some cohere	limited command of knowledge required ent and logical thinking, but with limited ems. Apply limited or barely effective organ	analytical and critical abilities. Sho		
	Fail	analytical and critical abil	evidence of command of knowledge rec ities, logical and coherent thinking. Show ninimally effective or ineffective.			
Course Type	Lecture w	ith laboratory compone	ent course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laboratory		a 5-hour laboratory session pe	r week for 5 weeks	25	
	Tutorials				6	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examinat	tion		80	CLO 1,2,3,4	
	Laborato	ry reports	lab performance & report	20	CLO 1,3,4	
Required/recommended reading and conline materials		Williams textbook of Endocrinology, (Elsevier, 11th Edition, 2009). Silverthorn: Human Physiology, An Integrated Approach (Pearson, 2006, 4" edition).				
Course Website	http://mod	odle.hku.hk/				
Additional Course Information	This cours	s course will be offered subject to a minimum enrollment number and availability of teachers.				

BIOL3505	Oyster	equaculture and restoration (6 credits)	Academic Year	2017		
Offering Department	Biologica	Sciences	Quota	20		
Course Co-ordinator	Dr T Ven	gatesen, Biological Sciences (rajan@hku.hk)				
eachers Involved						
Course Objectives	Introduce larval biology and hatchery technology; Provide scientific basis for coastal aquaculture through field demonstrations and laboratory exercises; Enable students to design, construct and maintain larval hatchery for production of seeds for aquaculture and restoration of wild oysters; Understand the reasons for restoration of marine, estuarine and coastal ecosystems; Facilitate transfer of academic knowledge to aquaculture for sustainable food production.					
Course Contents & Topics	This experiential learning course is to enhance students' knowledge in applied larval biology techniques advanced coastal aquaculture production systems that will enable them to design, construct, operate and main oyster aquaculture facilities for food production and restoration of wild population. This is an interdiscipling endeavor encompassing larval hatchery technology and aquaculture. After reading about basic oyster biology coastal aquaculture, we will focus on hatchery technology and aquaculture. Environmental issues, legislate pertaining to coastal aquaculture will also be covered using oyster farming in Hong Kong as an example. Studwill learn why oyster habitat is declining in HK and would also explore scientific and management ways to response to habitat. Students will be exposed to few aquaculture facilities in Hong Kong & will be taken to Per (Malaysia) to learn practical skills of oyster farming. This course is designed to meet the needs of an expan sustainable aquaculture in Hong Kong. Students will be exposed to a unique learning environment involving only HKU but also teachers from Universiti Sains Malaysia (USM), bringing with them diverse range of exper culture, and learning opportunities. Career and small scale business opportunities in aquaculture industry will discussed. Thus, students will be provided adequate knowledge & analytical capabilities for a successful care					
Course Learning Outcomes	CLO 1 e CLO 2 a ii CLO 3 e	larval biology research and aquaculture.  On successful completion of this course, students should be able to:  CLO 1 examine the influence of environmental variables on larval development and recruitment, and consider the potential effects of these variables on hatchery and farming  CLO 2 acquire skills and experiential learning opportunities (e.g. hands-on experiences at laboratories and farms in oyster hatchery and farming  CLO 3 explain the importance of oyster farming in coastal habitat restoration  CLO 4 plan and execute a commercially important research project in larval biology and aquaculture				
Pre-requisites and Co-requisites and Impermissible combinations)		IOL2103 or BIOL2306 or BIOL3301 or BIOL3303	,			
Offer in 2017 - 2018	N O	er in 2018 - 2019 : N	Examination			
Grade Descriptors (A+ to F)	A Evidence of original thought during the analysis of larval biology issues. Show evidence of analytical, critical and multidimensional thinking about the study subject. Extensive knowledge and skills required for attaining all the course learning outcomes. Demonstrate excellent ability to apply what you have learned in the class room to critically analyze the larval biology project data. Show highly effective organizational, presentational and field trip skills.					
	B Show substantial knowledge and thought during the analysis of marine life science issues. Show some evidence of some analytical, critical and multidimensional thinking about the study subject. Good knowledge and skills required for attaining all the course learning outcomes. Demonstrate good ability to apply what you have learned in the class room to critically analyze the real marine life science issues. Show effective organizational, presentational and field trip skills.					
	С	Show general but incomplete knowledge and original thought during the all and skills required for attaining all the course learning outcomes. Demonst class room to critically analyze the real marine life science issues. Show co skills.	rate fair ability to apply what yo	u have learned in th		
	D	Evidence to show a minimum knowledge (i.e. knowledge is very incomp science issues. Show insufficient knowledge and skills required for attaining				

		organizational, presentational			·		
		Evidence of meager or inadequate knowledge and understanding of marine life science issues. Show no evidence of knowledge and skills required for attaining all the course learning outcomes. Demonstrate no ability to apply what you have learned in the class room to critically analyze the real marine life science issues. Show no evidence of familiarity with relevant reading material and field trip demonstrations, or any knowledge of organizational and presentational skills.					
Course Type	Field camps	 S					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				25		
-	Field work				25		
	Laboratory	work			25		
	Tutorials				10		
	Presentation	on			5		
	Reading / S	Self study			20		
	Assessmer	•			10		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			25	CLO 3,4		
	Report		Presentation: developing innovative ideas for sustainable and economically viable aquacultre in Hong Kong	50	CLO 4		
	Test			25	CLO 1,2		
Required/recommended reading and online materials	Shellfish Ad Molluscan S	quaculture and the Env Shellfish Farming (Bria	rvae (Larry McEdward, CRC Press) ironment (S.E. Shumway, John Wiley & n Spencer, John Wiley & Sons)	& Sons)			
Course Website		biosch.hku.hk/ecology/					
Additional Course Information	Taught and trained by several teachers, guest lecturers from government and aquaculture business sector; This course is offered in close collaboration with USM (Penang, Malaysia); Tentative duration: 1-15 June, 2016; In Part 1 - First 5 days at HKU for lectures, practicals and field visits - then flight to Penang to visit various oyste aquaculture facilities; Few USM (Malaysia) students may join the course; Fund for the Penang visit will be collected from students (about 6000 HKD including airfare, accommodation and selective meals for 7 days). This course will be offered subject to a minimum enrollment number and availability of teachers. This course will be offered in alternative year.						

BIOL3508	Microbia	al physiology and biotechnology (6 credits)	Academic Year	2017				
Offering Department	Biological	Sciences	Quota	60				
Course Co-ordinator	Dr A Yan,	r A Yan, Biological Sciences <i>(ayan8@hku.hk)</i>						
Teachers Involved	(Dr A Yan	(Dr A Yan,Biological Sciences)						
Course Objectives	pharmace Biotechno applicatio such as e knowledg	are amazing and important entities on earth. Knowledgeutics, biotechnologies, diseases control, and biogeochemology provides both molecular basis for understanding of ins in modern Biotechnology, and to serve as essential four environmental, food, and medicinal Microbiology. Upon core about microorganisms, gain laboratory skills on methodo knowledge in Microbial Biotechnologies.	nical processes. Microbial these important processes ndations for sub-disciplines mpletion, students will acq	Physiology and and up-to-date of Microbiology uire fundamenta				
Course Contents & Topics	Microbial Breath', a interesting methodolo control', 'E biofuels a	Serving as a course which blends fundamental knowledge about the world of microorganisms with applied Microbial Biotechnology, This course is organized and presented in three themes: 'Microbial Breath', and 'Microbial Biotechnology'. Under these three themes, a broad range of highly educational and interesting topics are presented including: 'Microorganisms and their position in the living world', 'Fundamenta methodologies for the study of microbes', 'Microbial structures and functions', 'Microbial growth and control', 'Energy Generation', 'Central metabolism', and 'Microbial biotechnological applications in biodegradation biofuels and synthetic biology '. Topics are taught in a coherent manner with a highly interactive tutorial session following each of the topics such that students will achieve a high quality, stimulating, and problem-based learning						
Course Learning		ssful completion of this course, students should be able to:						
Outcomes	CLO 1	appreciate the diversity of microbial metabolisms and applica	ations in biotechnology					
	CLO 2 comprehend the principles underlying the dynamic nature of microbial physiology							
	CLO 3 gain laboratory skills on methodologies for microbial studies							
	CLO 4 relate knowledge to practical application of microbes in industry and medicine							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B Not for stu	IOL2103 or BIOL2220 or BIOC2600 or BIOC3604; udents who have passed in BIOL3108; and udents who have passed in BIOL4402.						
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2019 : Y	Examination	Dec				
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive kno outcomes. Show strong analytical and critical abilities and logical thinking knowledge to a wide range of complex, familiar and unfamiliar situations.	g, with evidence of original though	t, and ability to apply				
	В							
	С	Demonstrate general but incomplete command of knowledge required for evidence of some analytical and critical abilities and logical thinking, and Apply moderately effective organizational skills.						
	D	Demonstrate partial but limited command of knowledge required for at evidence of some coherent and logical thinking, but with limited analyt knowledge to solve problems. Apply limited or barely effective organizatio	ical and critical abilities. Show lir					
	Fail	Demonstrate little or no evidence of command of knowledge required						

	analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems Organizational skills are minimally effective or ineffective.					
Course Type	Lecture with laboratory component course					
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures			24		
	Laboratory			24		
	Project work			12		
	Reading / Self study			100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination		65	CLO 1,2,4		
	Laboratory reports		35	CLO 1,3,4		
Required/recommended reading and online materials	Woolverton, published the Supplementary Reading Brock Biology of Microck Pearson Publisher	y. organisms, by Michael Madigan, Jol octeriology: Kenneth Tobar, U. of V	hn Martinko, Kelly Bender, Daniel E	Buckley, David Stahl		
Course Website	http://moodle.hku.hk/	acto				
Additional Course Information		red subject to a minimum enrollment	t number and availability of teachers	S.		

BIOL3951	Ecology	& biodiversity field	d course (6 credits)	Academic Yea	ar 2017	
Offering Department	Biological		a course (e creame,	Quota	20	
Course Co-ordinator		zmarski, Biological Scie	ences (leszek@hku.hk)	14.		
Teachers Involved		zmarski,Biological Scie				
Course Objectives	This course is offered as a capstone experience and will require intense study of a topic relevant to					
•	the Ecolog	gy & Biodiversity Major	during a field course, inside or outside	Hong Kong.		
Course Contents & Topics	Every year a number of different potential courses may be offered. The precise contents will be tailored to best suit the topic and locality involved and will therefore vary according to the specific course being held. The basic contents will involve lectures, seminars and extensive field and follow-up laboratory work. It is essential that students contact the course coordinator for further information on the courses available.					
Course Learning	On succes	ssful completion of this	course, students should be able to:			
Outcomes	CLO 1 ur	derstand of the biodive	ersity and primary habitats in the ecosy	stem studied		
	CLO 3 be	knowledgeable abou cosystems studied	needed to identify target species assort and able to implement sampling to blogy of target species and how biotic a	echniques for organisms	s in the particular	
Pre-requisites			vanced level disciplinary core/elective			
(and Co-requisites and Impermissible	BIOL4XXX This caps	<ul><li>K) in the Ecology &amp; Biod tone course is for Ecology</li></ul>	. ,	, and the second	See (BioLovov oi	
combinations) Offer in 2017 - 2018		er in 2018 - 2019 : N	wed to take this capstone course is the	Examination		
Grade Descriptors	A OII		asp of the subject and relevant research techniq		m to learn and excellen	
(A+ to F)	familiarity with relevant background reading and case studies. Exemplary handling of field data collection and excellent analytical skills. Ample evidence of independent critical thought with excellent use of a broad range of fundamental concepts and broader comparative perspective to draw insightful and logical conclusions. Show outstanding abilities of independent work, effective presentation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree level.  B Evidence of a good grasp of the subject and relevant research techniques. Interest in learning and good-to-moderate familiarity with relevant background reading and case studies. Good handling of field data collection and commendable analytical skills. Good evidence of critical thought (although not always independent), with an appreciable use of fundamental concepts and consideration of broader comparative perspective in drawing logical conclusions. Good abilities of independent work, effective presentation skills with logical and analytical argumentation. Work more than sufficient for what is required at degree level.					
	Demonstrate an adequate, but incomplete grasp of the subject and relevant research techniques. Moderate familiarity with relevant background reading and case studies, but no interest in learning beyond the adequate average level. Evidence of logical critical thinking (although not always independent), with mostly good use of fundamental concepts to draw logical conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.					
	D Demonstrate some grasp of the subject, but only partial and with limited understanding of relevant research concepts and research techniques. Some familiarity with relevant case studies, but insufficient evidence of background reading and limited abilities of critical independent thinking. Ineffective presentation skills with generally weak logical argumentation with restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.					
	Fail	No evidence of basic a background reading and n thought; ineffective preser reach degree level.	minimum grasp of the subject and the minim no familiarity with any relevant examples and contation skills with poor argumentation and no a	num relevant research techni ase studies. Inadequate evide	nce of coherent logical	
Course Type	Field cam					
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Field worl				42	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		35	CLO 1,2,3,4	
	Report		project report (35%), group			
			investigation & presenation (30%)	65	CLO 1,2,3,4	
Required/recommended reading and online materials		will be directed to releva		65	CLO 1,2,3,4	

Additional Course Information	Students can choose either one of the following courses: Subclass A: Marine Mammal Field Course Subclass B: Animal Behaviour Field Course
	Enrollment Procedure: The course is open to enrollment only during the add/drop period of the 2nd semester. Students are required to submit a brief (maximum 1-page) application letter (PDF file) via e-mail to the Course Coordinator (leszek@hku.hk) not later than 11 January 2016. The application shall include the following:  1. Personal and academic details 2. ID photograph 3. Brief description of academic interests 4. GPA 5. Pre-requisite courses taken and grades received (if pre-requisites are not met, a reasoned request for waiver) All applications will be reviewed prior to the commencement of the 2nd semester and results will be announced within the 1st week of the add/drop period of the 2nd semester.

BIOL3991	Directe	d studies in ecology	& biodiversity (6 credits)	Academic Year	2017	
Offering Department	Biologica	l Sciences		Quota		
Course Co-ordinator	Prof G A	Williams, Biological Scie	nces (hrsbwga@hku.hk)			
Teachers Involved		63	iodiversity Major, Biological Sciences)			
Course Objectives	will not in study. Co- including	Students will undertake a dissertation on a topic related to the field of ecology and biodiversity. The dissertation will not involve any practical research in terms of laboratory or fieldwork, but will take the form of a desk-top study. Conducting a dissertation is an independent learning experience and will enable students to develop skills including the use of library and Web-based resources; the logical development of scientific arguments; written presentation skills; and personal time management.				
Course Contents & Topics	of Ecolog	An appropriate dissertation topic will be selected from a predeterminted list and following discussion with a member of Ecology & Biodiversity staff, who will act as the student's supervisor. Formal teaching will be limited and aimed at introducing students to the techniques necessary for successful completion of their dissertation.				
Course Learning	On succe	essful completion of this of	course, students should be able to:			
Outcomes			ic question or knowledge gap			
			ture approach to test the question pose			
	р	rinciples; including statist	research to test the question / address tical analyses where appropriate	the knowledge gap usin	g sound scientific	
			c conclusions from their research			
Due ne maielte e		resent their research as	· ·		);1;; t N.A - ;	
Pre-requisites (and Co-requisites and Impermissible combinations)	This caps	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology & Biodiversity Major. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.				
Offer in 2017 - 2018	Y Ye	ear long Offer in 2018 -	2019 : N	Examination	No Exam	
Grade Descriptors (A+ to F)	A Evidence of complete or near-complete understanding and a thorough grasp of the subject matter as demonstrated by attainment of all learning outcomes. Excellent critique and knowledge of relevant literature and identification of research hypothesis. Well designed scientific approach to test research hypothesis. Show excellent organizational and/or analytical skills. Demonstrate comprehensive, critical, assessment of findings and professional presentation of research work.					
	B Evidence of near-complete understanding and a good grasp of the subject matter as demonstrated by attainment of the majority of learning outcomes. Good critique and knowledge of relevant literature and identification of research hypothesis. Appropriately designed scientific approach to test research hypothesis. Show good organizational and/or analytical skills. Demonstrate effective, critical, assessment of findings and good presentation of research work.					
	C Evidence of adequate understanding and grasp of the subject matter as demonstrated by general but incomplete attainment of most of the learning outcomes. Acceptable critique and knowledge of relevant literature and identification of research hypothesis. Adequately designed scientific approach to test research hypothesis. Show fair organizational and/or analytical skills. Demonstrate adequate but not necessarily critical, assessment of findings and presentation of research work.					
	D Evidence of limited understanding and grasp of the subject matter as demonstrated by incomplete attainment of many of the learning outcomes. Limited critique and knowledge of relevant literature and identification of research hypothesis. Poorly designed scientific approach to test research hypothesis. Show fair organizational and/or analytical skills. Demonstrate confused and poorly organized assessment of findings and limited presentation of research work.					
	Fail  Evidence of poor or inadequate understanding and grasp of the subject matter such that most of the learning outcomes are no attained. Poor critique and knowledge of relevant literature and identification of research hypothesis. Badly designed scientific approach to test research hypothesis. Show little evidence of appropriate organizational and/or analytical skills. Demonstrate incorrect interpretation and assessment of findings and poor presentation of research work.					
Course Type		ased course				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Reading	/ Self study	at least 120 hours on the dissertation	or project	120	
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Researc	h report	Mid-term written essay plan (20%), Written report 6000-7000 words (excluding figures and references) (80%)	100	CLO 1,2,3,4,5	
Course Website	http://ww	w.biosch.hku.hk/ecology/				
Additional Course Information	Regular i	meetings between the si	upervisor and student. Guidance from entifically. Students should spend at lea			

BIOL3992	Directed studies in food & nutritional science (6 credits)	Academic Year	2017		
Offering Department	Biological Sciences	Quota			
Course Co-ordinator	Dr O Habimana, Biological Sciences (Ohabim@hku.hk)				
Teachers Involved	(All academic staff in Food & Nutritional Science Major, Biological Sciences)				
Course Objectives	This course aims to provide a stimulating capstone experience for all Foundergraduates to integrate and apply their knowledge and skills obtained from t		Science Major		

Course Contents & Topics	The directed study can be a review of literature on a specific topic, or a lab or field study that enhances the student's understanding of the topic in the field of food & nutritional science. The student should obtain the commitment of a supervisor in the area of the dissertation topic before submitting the registration form for the course (available from the General Office of School of Biological Sciences). Supervisor will introduce various methodologies/techniques and guide students to completion of the dissertation. Teaching will be informal and students will gain knowledge through discussion and feedback from their supervisors.					
Course Learning			course, students should be able to:			
Outcomes			ess of scientific enquiry			
			nding of the nature of food & nutritiona			
			Is to address important issues in variou			
Pre-requisites			ctual skills that will be valubale for all salvanced level disciplinary core/elective		rses (BIOL3XXX or	
(and Co-requisites	BIOL4XX	X) in the Food & Nutriti	onal Science Major.	-		
and Impermissible			1 & Nutritional Science Major students of the students of t			
combinations)	The earlie	est that a student is allo	wed to take this capstone course is the	eir year 3 study.		
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offe		Examination	No Exam	
Grade Descriptors (A+ to F)	A	dissertation topic, showing of the research; comprehe comprehensive and up-to- problems and their solution well-connected and prese	level of scholarship and originality; virtually g a thorough grasp of the topic from background ensive exploration of the topic, personal synthesis- date references integrated into argument or logi- ons and implications; thought-provoking discuss- nted logically with clarity of goals, demonstrating dissertation meet the specified requirements. A	reading and analysis; clear sta s of the issues with detailed su cal reasoning; critical evaluatic ions; accurate summary. All c excellent organizational, rheto	tement of the objectives pport from the literature; ons of the main points or chapters/paragraphs are prical and presentational	
	B Work showing some evidence of originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; demonstrating substantial understanding of fundamental concepts of the field of study; adequate grasp of the topic from background reading and analysis; a systematic exploration of the topic which may include an attempt at critical comment or appraisal; regular support provided from the literature; comprehensive and up-to-date references included; main points fully elaborated; summary given in the final chapter/paragraphs; communicating information and ideas clearly and fluently, demonstrating good organizational, rhetorical and presentational skills. The length of the dissertation meet the specified requirements. Most aspects conform to a high academic standard.					
	С					
	Demonstrating superficial or partial or faulty understanding of the fundamental concepts of the field of study; showing the bare minimum of information, poorly digested and not very well organized in presentation; irrelevant material; showing no evidence of critical thinking; arguments undeveloped or inappropriate or unsupported; lack of clarity or structure in communicating information or ideas. dissertation topic not fully covered; discussion to brief or just repeating the data or findings; overuse quotations with little explanation; insufficient support from literature; reading not well incorporated into the text; limited acknowledgements and light bibliography; some major points missed. Minimum conform to an acceptable academic standard.					
	Fail	The dissertation topic w understanding fundament ideas; unreflective; incol acknowledgements or bib the course. The written wo	vas not covered acceptably; demonstrating e al concepts; materials largely irrelevant; incon nerent argument; complete misinterpretation o liography); structure confused or not discernible ork is not of an academic standard.	evidence of poor knowledge, aplete or confusing communic of the topic or data; no evi	clear deficiencies in cation of information or dence of reading (no	
Course Type		ased course				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities		/ Self study	at least 120 hours on the dissertation		120	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral pres	sentation	15 minutes (Plus 5 minutes for questions and answers).	20	CLO 1,2,3,4	
	Research	n report	Written report 6000-8000 words (excluding figures and references).	80	CLO 1,2,3,4	
Course Website	http://mod	odle.hku.hl/				
Additional Course Information	and on ho		supervisor and student. Guidance fron ientifically. Students should spend at leastigned			

BIOL3993	Directed studies in Molecular biology & biotechnology (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota				
Course Co-ordinator	Dr W K Yip, Biological Sciences (wkyip@hku.hk)					
Teachers Involved	(All academic staff in Molecular Biology & Biotechnology Major, Biological Sci	ences)				
Course Objectives	This course aims to provide a stimulating capstone experience for all Mole undergraduates to integrate and apply their knowledge and skills obtained from		echnology Major			
Course Contents & Topics	The directed study can be a review of literature on a specific topic, or a lab or field study that enhances the student's understanding of the topic in the field of molecular biology & biotechnology. The student should obtain the commitment of a supervisor in the area of the dissertation topic before submitting the registration form for the course (available from the General Office of School of Biological Sciences). Supervisor will introduce various methodologies/techniques and guide students to completion of the dissertation. Teaching will be informal and students will gain knowledge through discussion and feedback from their supervisors.					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 acquaint with the process of science  CLO 2 have a better understanding of the nature of molecular biology & biotechnology  CLO 3 apply scientific methods to address important issues in various biological disciplines  CLO 4 develop the key intellectual skills that will be valubale for all scientific studies					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Molecular Biology & Biotechnology Major.  This capstone course is for Molecular Biology & Biotechnology Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2017 - 2018	Y 1st sem 2nd sem Offer in 2018 - 2019 : Y	Examination	No Exam			

Grade Descriptors (A+ to F)	Work displaying a high level of scholarship and originality; virtually flawless presentation with excellent introduction to dissertation topic, showing a thorough grasp of the topic from background reading and analysis; clear statement of the objectives of the research; comprehensive exploration of the topic, personal synthesis of the issues with detailed support from the literature; comprehensive and up-to-date references integrated into argument or logical reasoning; critical evaluations of the main points or problems and their solutions and implications; thought-provoking discussions; accurate summary. All chapters/paragraphs are well-connected and presented logically with clarity of goals, demonstrating excellent organizational, rhetorical and presentational skills. The length of the dissertation meet the specified requirements. All other aspects of the dissertation conform to a high academic standard.					
	В					
	С					
	D					
	Fail					
Course Type		based course				
Course Teaching	Activit		Details		No. of Hours	
& Learning Activities		g / Self study	at least 120 hours on the dissertation or project		120	
Assessment Methods and Weighting	Method	ds	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral pr	esentation	15 minutes (Plus 5 minutes for questions and answers).	20	CLO 1,2,3,4	
	Resear	ch report	Written report 6000-8000 words (excluding figures and references).	80	CLO 1,2,3,4	
Course Website	http://m	oodle.hku.hk/				
Additional Course Information	and on		ne supervisor and student. Guidance fro scientifically. Students should spend at le be assigned.			

BIOL3994	Directed studies in biological sciences (6 credits)	Academic Year 2017				
Offering Department	Biological Sciences	Quota				
Course Co-ordinator	Prof W W M Lee, Biological Sciences (hrszlwm@hku.hk)					
Teachers Involved	(All academic staff in Biological Sciences Major, Biological Sciences)					
Course Objectives	This course aims to provide a stimulating capstone experience for all Biological Sciences Major undergraduates to integrate and apply their knowledge and skills obtained from the Major.					
Course Contents & Topics	The directed study can be a review of literature on a specific topic, or a lab or field study that enhances the student's understanding of the topic in the field of biological sciences. The student should obtain the commitment of a supervisor in the area of the dissertation topic before submitting the registration form for the course (available from the General Office of School of Biological Sciences). Supervisor will introduce various methodologies/techniques and guide students to completion of the dissertation. Teaching will be informal and students will gain knowledge through discussion and feedback from their supervisors.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 acquaint with the process of science					
	CLO 2 have a better understanding of the nature of biological sciences					
	CLO 3 apply scientific methods to address important issues in various biological disciplines					
	CLO 4 develop the key intellectual skills that will be valuable for all scientific studies					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX o BIOL4XXX) in the Biological Sciences Major.  This capstone course is for Biological Sciences Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2017 - 2018	Y 1st sem 2nd sem Offer in 2018 - 2019 : Y	Examination No Exam				
Grade Descriptors (A+ to F)	A Work displaying a high level of scholarship and originality; virtua dissertation topic, showing a thorough grasp of the topic from background for the research; comprehensive exploration of the topic, personal synth comprehensive and up-to-date references integrated into argument or problems and their solutions and implications; thought-provoking discusting well-connected and presented logically with clarity of goals, demonstrations. The length of the dissertation meet the specified requirements academic standard.	und reading and analysis; clear statement of the objective nesis of the issues with detailed support from the literature logical reasoning; critical evaluations of the main points or cussions; accurate summary. All chapters/paragraphs are ating excellent organizational, rhetorical and presentational				
	Work showing some evidence of originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; demonstrating substantial understanding of fundamental concepts of the field of study; adequate grasp of the topic from background reading and analysis; a systematic exploration of the topic which may include an attempt at critical comment or appraisal; regular support provided from the literature; comprehensive and up-to-date references included; main points fully elaborated; summary given in the final chapter/paragraphs; communicating information and ideas clearly and fluently, demonstrating good organizational, rhetorical and presentational skills. The length of the dissertation meet the specified requirements. Most aspects conform to a high academic standard.					
	Work showing no evidence of originality and insight, but the presentation demonstrated adequate understanding and comprehension of most aspects of the dissertation topic; essential topic materials have been read and acknowledged; the mair points presented in logically sequential paragraphs; reasonably balanced discussion of the major issues; acceptable interpretation of the topic, some explanation, illustration and support provided from the literature; summary given in the final chapter/paragraphs; most presentation details met (front page, margin, legibility, citations correctly reported and tabulated, etc.) few typos or grammatical errors; Most aspects conform to an acceptable academic standard.					

	minimum of informat critical thinking; arg information or ideas quotations with little acknowledgements at The dissertation to understanding fundation dideas; unreflective; acknowledgements of the critical crit	Demonstrating superficial or partial or faulty understanding of the fundamental concepts of the field of study; showing the baminimum of information, poorly digested and not very well organized in presentation; irrelevant material; showing no evidence critical thinking; arguments undeveloped or inappropriate or unsupported; lack of clarity or structure in communicatii information or ideas. dissertation topic not fully covered; discussion too brief or just repeating the data or findings; overu quotations with little explanation; insufficient support from literature; reading not well incorporated into the text; limit acknowledgements and light bibliography; some major points missed. Minimum conform to an acceptable academic standard. The dissertation topic was not covered acceptably; demonstrating evidence of poor knowledge, clear deficiencies understanding fundamental concepts; materials largely irrelevant; incomplete or confusing communication of information ideas; unreflective; incoherent argument; complete misinterpretation of the topic or data; no evidence of reading (I acknowledgements or bibliography); structure confused or not discernible; Fail to meet most or all of the basic requirements the course. The written work is not of an academic standard.			
Course Type	Project-based course				
Course Teaching & Learning Activities	Activities	Details	Details		
	Reading / Self study	at least 120 hours on the dissertation	at least 120 hours on the dissertation or project		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral presentation	15 minutes (Plus 5 minutes for questions and answers).	20	CLO 1,2,3,4	
	Research report	Written report 6000-8000 words (excluding figures and references).	80	CLO 1,2,3,4	
Course Website	http://moodle.hku.hk/				
Additional Course Information	Regular meetings between the supervisor and student. Guidance from the supervisor on the scientific methods, and on how to think and write scientifically. Students should spend at least 120 hours on the dissertation or project. Recommended reading may be assigned.				

BIOL4201	Public health nutrition (6 credits)  Academic Ye				<b>Year</b> 2017	
Offering Department	Biological	Sciences		Quota	90	
Course Co-ordinator	Dr J M F	Wan, Biological Sci	ences (jmfwan@hku.hk)			
Teachers Involved	(Dr J M F	Wan, Biological Sci	ience)			
Course Objectives	Public health nutrition unites social sciences and biomedical sciences in preventing disease and improving humar health through programs aimed at enhancing good nutritional practices. This course presents a broad overview of the professional practice and essential skills required of a public health nutritionist.					
Course Contents & Topics	Public health nutrition: overview, nature and identification of problems, objectives of intervention programs. The epidemiological study of diet: disease associations. Development of dietary guidelines. Undernutrition and overnutrition: definitions, prevalence, public health consequences, and interventions. Epidemiology, public health consequences, and elimination of vitamin and mineral deficiencies. Disease prevention. Educating the public fo healthy eating and food safety.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 have a broad knowledge of the scope and methodologies of public health nutrition					
	CLO 2 have a clear technical understanding of a range of selected examples of public health nutrition cases in less-developed and developed countries					
	CLO 3 be	e able to formulate	recommendations for action for n	utritional interventions at the co	ommunity level	
	CLO 3 be able to formulate recommendations for action for nutritional interventions at the community level CLO 4 understand the impact of socio-cultural factors on community food choices and consequently on health outcomes					
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in BIOL3201 or BIOL3202					
Offer in 2017 - 2018	Y 2nd	d sem Offer in 20	18 - 2019 : Y	Examination	on May	
Grade Descriptors (A+ to F)	Α	learning outcomes. To of original thought, a effective organization	In mastery at an advanced level of extensive knowledge and skills required for attaining all the course norough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly all and presentational skills. Apply highly effective laboratory/fieldwork skills and techniques. Critical use of aw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.			
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective laboratory /fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective laboratory / fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes Partial but limited grasp of the subject, retention of some relevant information of the subject. Show evidence of some coherer and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems Apply limited or barely effective organizational and presentational skills. Apply partially effective lab / fieldwork skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Litt or no grasp of the knowledge and understanding of the subject. Lack of analytical and critical abilities, logical and coherer thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimal effective or ineffective. Apply minimally effective or ineffective laboratory / fieldwork skills and techniques. Misuse of data an results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-based course					
Course Teaching	Activitie	S	Details		No. of Hours	
Learning Activities	Lectures					
	Tutorials  30 hours student investigative report, & 12 hours of tutorials/presentations		42			
	Reading	eading / Self study		100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)		
					to one mapping	

	Examination	70	CLO 1,2,3,4
Required/recommended reading and online materials	Public Health Nutrition (The Nutrition Society Textbook Series, 2004) MJ Gibney, BM Margetts, JM Kearney, L Arab (Eds)		
Course Website	http://moodle.hku.hk/		
Additional Course Information	This course will be offered subject to a minimum enrollment number a	and availability of teachers.	

BIOL4202	Nutrition	n and sports perfor	mance (6 credits)	Academic Year	2017		
Offering Department	Biological	30					
Course Co-ordinator	Dr T Sobko, Biological Sciences (tsobko@hku.hk)						
Teachers Involved		ko,School of Biological		art narfarmanas Mars	annifically to soi		
Course Objectives	To demonstrate evidence-based links between nutrition, exercise and sport performance. More specifically, to gain in-depth understanding about how the metabolic demands of exercise influence physiological and cognitive functions and exercise performance. To focus on the role of major macronutrients, minerals, vitamins, antioxidants, supplements and hydration in sustaining and enhancing sports performance during short-duration, intermittent and endurance exercise.						
Course Contents & Topics	Nutrition aims and requirements differ during habitual exercise and competitive sports: from endogenous adaptations to developing metabolic efficiency to competition nutrition. Professional athletes enhance their performance through appropriate nutrition, following the recommendations of the International Olympic Committee: "The amount, composition and timing of food intake can profoundly affect sports performance" (Maughan et al, 2004). The course will firstly examine the physiological needs pre-, during and post-competition and/or habitual exercise to perform at its best. Secondly, it will investigate how and why nutrient and energy intakes vary between different athlete groups, the difference between energy metabolism and requirements during aerobic and anaerobic exercise. Putting exercise and sports performance in focus, the topics will include: energy balance; macronutrients; selected micronutrients; fluid balance and hydration strategies; weight loss and weight gain in athletes, sport foods and supplements; position stands and new perspectives on sports nutrition, nutrient/energy requirements in exercise and sports, ergogenic aids and myths of sport nutrition						
Course Learning			course, students should be able to:				
Outcomes	CLO 1 critically examine and describe the need of energy, nutrients and fluid before, during and after the physical exercise in relation to different sports, individual athletes and performance situations  CLO 2 describe the impact of dietary macronutrients, vitamins and minerals on physical performance						
	<ul> <li>CLO 3 provide an overview of the position stands on major misconceptions in sports nutrition. Being a evaluate, explain and communicate current, evidence based epidemiological knowledge behind position stands.</li> <li>CLO 4 access and analyze the importance of meal frequency, energy source and supplements o performance in different sports.</li> <li>CLO 5 demonstrate convincing argument for importance of balanced nutrition for sports performance and health.</li> </ul>						
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in BIOL3202						
Offer in 2017 - 2018	Y 2nd	I sem Offer in 2018 - 2		Examination	May		
Grade Descriptors (A+ to F)	В	Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use quality management skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.  Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-					
	С	based organizational and presentational skills  Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems.					
	D	Demonstrate moderately effective team-based organizational and presentational skills.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.					
	Fail	and logical thinking, and techniques and analysis of real-world problems. Demo	asp, with retention of little relevant information, o minimal competence in professional-level prod data and results ineffectively, leading generally to instrate ineffectiveness team-based organizational	olem solving. Use quality ma o inappropriate and usually err	inagement skills and		
Course Type Course Teaching		ased course	Detaile		No of Herror		
Sourse Teaching Learning Activities	Activities Lectures	5	Details with practicals		No. of Hours 36		
ourning Addivided	Tutorials		with practicals		10		
	Discussion				20		
		Self study			50		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Final group presentation (30%), Critical reviews of other student's final project presentations (10%)	40	CLO 1,2		
Di	Examinat		ha mandalad on March 1997	60	CLO 1,2,4,5		
Required/recommended reading and online materials	Most of the reading material will be provided on Moodle or given during lectures; however, do make use of the book and journal resources in HKU's libraries including: -Sport Nutrition. An introduction to Energy Production and Performance. Asker Jeukedrup & Michael Gleesor (2004)Sports and Exercise Nutrition. William McArdle, Frank Katch, Victor Katch. (2009)Modern Nutrition in Health and Disease, (2103) Eleventh edition.						

Course Website	http://moodle.hku.hk
Additional Course Information	This course will be offered subject to a minimum enrollment number and availability of teachers.

BIOL4204	Diet, bra	ain function and bel	havior (6 credits)	Academic Ye	ear 2017			
Offering Department	Biological	l Sciences		Quota	30			
Course Co-ordinator	DrETSI	Li, Biological Sciences (	etsli@hku.hk)					
Teachers Involved	(Dr E T S	Li, Biological Sciences)						
	(Dr J C Y	Lee, Biological Sceinces	s)					
Course Objectives	To highlio	ght the impact of nutrie	ent provision on brain structur	e and function, and to discus	s various effects o			
•		and diet on mental functi						
Course Contents				n development; Diet, learning	& memory function			
& Topics				r; Physiological and socio-culti				
	dietary be			.,,				
Course Learning	,		course, students should be abl	le to:				
Outcomes				n and how nutrition influences i	ts development			
			nsequences of malnutrition on					
			ol as a function of food-gut-bra	•				
		11 11	es between bioactive food ingre					
			9	cues that determine dietary be	haviour			
Pre-requisites		IOL3204, or already enr	•	odeo that dotornine dictary be	inavioui			
(and Co-requisites	1 433 111 1	nocozo+, or alleady crit	oned in this course					
and Impermissible								
combinations)								
Offer in 2017 - 2018	N Off	fer in 2018 - 2019 : N		Examination				
Grade Descriptors	A		asn of the subject matter covered	Show exceptional ability on knowled	lge integration problem			
(A+ to F)	<b> </b> ^	identification and solving.	Show outstanding ability to critically	, analyze and interpret scientific data	a and draw appropriate			
` ′		conclusions. Demonstrate highly effective presentation / writing skills.						
	B Demonstrate substantial grasp of the subject matter covered. Show full ability on knowledge integration, problem identification							
	and solving. Show reasonable ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate effective presentation / writing skills.							
	Demonstrate general but incomplete grasp of the subject matter covered. Might show misunderstanding of the materials. Show							
	some ability on knowledge integration, problem identification and solving. Show some ability to analyze and interpret scientific							
	data and draw proper conclusions. Demonstrate adequate organization / writing skills.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered.							
	D			ome relevant information, of the si ted ability on knowledge integration, p				
		solving. Use elementary a	approaches to analyze and interpret	scientific data and draw sometimes	erroneous conclusions.			
		Demonstrate basic organiza						
	Fail Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in problem solving. Fail to integrate information and identify problems. Seriously							
				y. Fail to integrate information and fde v conclusions. Demonstrate poor organ				
Course Type	Lecture-b	ased course						
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Lectures		Details		36			
a Learning Activities	Tutorials		tutorials/group discussions/s	ominoro				
				emmars	12			
	Project w	ork .	oral presentation	emmars	12 12			
	Project w Reading	ork / Self study	oral presentation		12 12 100			
	Project w	ork / Self study		Weighting in final	12 12 100 <b>Assessment</b>			
	Project w Reading	ork / Self study	oral presentation		12 12 100 Assessment Methods			
Assessment Methods and Weighting	Project w Reading Methods	/ork / Self study s	oral presentation	Weighting in final course grade (%)	12 12 100 Assessment Methods to CLO Mapping			
	Project w Reading Methods	vork / Self study 6	oral presentation	Weighting in final course grade (%)	12 12 100 Assessment Methods to CLO Mapping CLO 1,2,4			
	Project w Reading Methods Assignme Examinat	vork / Self study 6 ents tion	oral presentation	Weighting in final course grade (%)  20 60	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4			
	Project w Reading Methods	vork / Self study 6 ents tion	oral presentation	Weighting in final course grade (%)	12 12 100 Assessment Methods to CLO Mapping CLO 1,2,4			
and Weighting	Project w Reading Methods Assignme Examinal Presenta	vork / Self study s ents tion	oral presentation  Details	Weighting in final course grade (%)  20 60	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4 CLO 2,4			
and Weighting  Required/recommended	Project w Reading Methods Assignme Examinal Presenta	vork / Self study s ents tion	oral presentation  Details	Weighting in final course grade (%)  20 60 20	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4 CLO 2,4			
	Project w Reading Methods Assignme Examinal Presenta Copper J. 2003	vork / Self study s ents tion tion . R., Bloom F. E. & Rot	oral presentation  Details	Weighting in final course grade (%)  20 60 20 is of Neuropharmacology. Oxfo	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4 CLO 2,4			
and Weighting  Required/recommended reading and	Project w Reading Methods Assignme Examinal Presenta Copper J. 2003 Lieberma	vork / Self study s ents tion tion . R., Bloom F. E. & Rot	oral presentation  Details  h R. H.: The Biochemical Bas  R Prasad C.: Nutritional Neuros	Weighting in final course grade (%)  20 60 20 is of Neuropharmacology. Oxfo	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4 CLO 2,4			
and Weighting  Required/recommended reading and	Project w Reading Methods  Assignment Examinal Presenta Copper J. 2003 Lieberma Nutritiona Physiolog	rork / Self study sents tion tion . R., Bloom F. E. & Rot n H. R., Kanarek R. B. & ll Neuroscience (Journal gy and Behavior (Journa	oral presentation  Details  h R. H.: The Biochemical Bas  R Prasad C.: Nutritional Neuros	Weighting in final course grade (%)  20 60 20 is of Neuropharmacology. Oxfo	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4 CLO 2,4			
and Weighting  Required/recommended reading and	Project w Reading Methods  Assignme Examinal Presenta Copper J. 2003 Lieberma Nutritiona Physiolog Appetite (	rork / Self study sents tion tion . R., Bloom F. E. & Rot n H. R., Kanarek R. B. & il Neuroscience (Journal y and Behavior (Journa	oral presentation  Details  h R. H.: The Biochemical Bas  & Prasad C.: Nutritional Neuros  )	Weighting in final course grade (%)  20 60 20 is of Neuropharmacology. Oxfo	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4 CLO 2,4			
and Weighting  Required/recommended reading and online materials	Project w Reading Methods  Assignme Examinal Presenta Copper J. 2003 Lieberma Nutritiona Physiolog Appetite (	rork / Self study sents tion tion . R., Bloom F. E. & Rot n H. R., Kanarek R. B. & ll Neuroscience (Journal gy and Behavior (Journa	oral presentation  Details  h R. H.: The Biochemical Bas  & Prasad C.: Nutritional Neuros  )	Weighting in final course grade (%)  20 60 20 is of Neuropharmacology. Oxfo	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4 CLO 2,4			
and Weighting  Required/recommended reading and	Project w Reading Methods  Assignme Examinal Presenta Copper J. 2003 Lieberma Nutritiona Physiolog Appetite ( Journal of	rork / Self study sents tion tion . R., Bloom F. E. & Rot n H. R., Kanarek R. B. & il Neuroscience (Journal y and Behavior (Journa	oral presentation  Details  h R. H.: The Biochemical Bas  & Prasad C.: Nutritional Neuros  )	Weighting in final course grade (%)  20 60 20 is of Neuropharmacology. Oxfo	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4 CLO 2,4			
and Weighting  Required/recommended reading and online materials	Project w Reading Methods  Assignme Examinal Presenta Copper J 2003 Lieberman Nutritiona Physiolog Appetite ( Journal of	ork / Self study sents tion tion . R., Bloom F. E. & Rot IN Neuroscience (Journal by and Behavior (Journa (Journal) f Nutritional Biochemistr	oral presentation  Details  h R. H.: The Biochemical Bas Prasad C.: Nutritional Neuros ()  l)  y (Journal)	Weighting in final course grade (%)  20 60 20 is of Neuropharmacology. Oxfo	12 100 Assessment Methods to CLO Mapping CLO 1,2,4 CLO 1,2,3,4 CLO 2,4 ord University Press			

BIOL4205	Food processing and engineering (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	15
Course Co-ordinator	Prof. N P Shah, Biological Sciences (npshah@hku.hk)		
Teachers Involved	(Prof. N P Shah, Biological Sciences)		
Course Objectives	To provide students with basic principles and methodologies of food processing cover key engineering principles relevant to the food industry. Students will gain food processing and preservation techniques.		
Course Contents & Topics	Food processing is a multidisciplinary field combining applied physical sci properties and requirements. This course introduces the technical knowledge production and commercialization of food products and services. The desig equipment and machinery used to convert raw agricultural materials and innutritious consumer food products are covered. We discuss the basic engine methods in food processing and preservation. Techniques discussed will temperature processing, concentration, dehydration, baking and extrusion.	equired to implem n and developme redients into safe, ering principles an	ent cost-effective nt of processes, convenient, and d applications of
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand basic principles of food processing methods and preservation  CLO 2 be able to apply their knowledge and practical skills to process and deviations.	- 0,	

Dro roguioitos	Doon in F	oreservation						
Pre-requisites (and Co-requisites and Impermissible combinations)		BIOL3201						
Offer in 2017 - 2018	Y 2n	nd sem Offer in 2018 -	- 2019 : Y	Examination	May			
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject matter covered. Show strong evidence of analytical and critical abilities of the changes that take place in variety of food during preparation, processing and storage. Identifies and uses advanced techniques and equipment for a variety of food-specific purposes. Demonstrates advance skills in designing, producing and evaluating solutions of excellent quality for specific food purposes. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions.						
	В	that take place in variety variety of food-specific pu	grasp of the subject matter covered. So of food during preparation, processing a urposes. Demonstrates high-level skills es. Use lab skills and techniques and	nd storage. Identifies and uses technic in designing, producing and evaluating	ques and equipment for a g solutions of high quality			
	С	abilities and logical think Identifies and uses appro in designing, producing a	t incomplete grasp of the subject matter king of the changes that take place in priate techniques and equipment for a vand evaluating solutions of sound quality that to draw moderately appropriate concl	variety of food during preparation, variety of food-specific purposes. Dem v for specific food purposes. Use lab	processing and storage nonstrates adequate skills			
	D	analysis of data and results to draw moderately appropriate conclusions.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking of the changes that take place in variety of food during preparation, processing and storage. Identifies and uses basic techniques and equipment for a variety of food-specific purposes. Demonstrates basic skills in designing, producing and evaluating solutions for specific food purposes. Use lab skills and techniques and analysis of data and results to draw appropriate conclusions occasionally.						
	Fail	and logical thinking of he guidance factors and us guidance, demonstrates	grasp, with retention of little relevant inforce changes that take place in variety of fives some appropriate techniques and elimited skills in designing, producing and alysis of data and results ineffectively	ood during preparation, processing an equipment for a limited range of food d evaluating solutions for specific food	nd storage. Identifies with I-specific purposes. With I purposes. Use lab skills			
Course Type		and logical thinking of he guidance factors and us guidance, demonstrates and techniques and and	c changes that take place in variety of fi es some appropriate techniques and e limited skills in designing, producing and alysis of data and results ineffectively	ood during preparation, processing an equipment for a limited range of food d evaluating solutions for specific food	nd storage. Identifies with I-specific purposes. With I purposes. Use lab skills			
Course Teaching		and logical thinking of he guidance factors and us guidance, demonstrates and techniques and an conclusions. with laboratory compone	c changes that take place in variety of fi es some appropriate techniques and e limited skills in designing, producing and alysis of data and results ineffectively	ood during preparation, processing an equipment for a limited range of food d evaluating solutions for specific food	nd storage. Identifies with I-specific purposes. With I purposes. Use lab skills			
Course Teaching	Lecture v	and logical thinking of he guidance factors and us guidance, demonstrates and techniques and an conclusions.  with laboratory componens	c changes that take place in variety of fi es some appropriate techniques and e limited skills in designing, producing and alysis of data and results ineffectively ent course	ood during preparation, processing an equipment for a limited range of food d evaluating solutions for specific food	nd storage. Identifies with d-specific purposes. With d purposes. Use lab skills and usually erroneous			
Course Teaching	Lecture v	and logical thinking of he guidance factors and us guidance, demonstrates and techniques and an conclusions.  with laboratory componers	c changes that take place in variety of fi es some appropriate techniques and e limited skills in designing, producing and alysis of data and results ineffectively ent course	ood during preparation, processing an equipment for a limited range of food d evaluating solutions for specific food	nd storage. Identifies with specific purposes. With d purposes. Use lab skills and usually erroneous No. of Hours			
Course Teaching	Lecture v	and logical thinking of he guidance factors and us guidance, demonstrates and techniques and an conclusions.  with laboratory componers	e changes that take place in variety of fees some appropriate techniques and elimited skills in designing, producing and alysis of data and results ineffectively ent course  Details	ood during preparation, processing an equipment for a limited range of food d evaluating solutions for specific food	nd storage. Identifies with specific purposes. With d purposes. Use lab skills and usually erroneous  No. of Hours  24			
Course Teaching	Lecture v Activitie Lectures Laborato Tutorials	and logical thinking of he guidance factors and us guidance, demonstrates and techniques and an conclusions.  with laboratory componers	e changes that take place in variety of fees some appropriate techniques and elimited skills in designing, producing and alysis of data and results ineffectively ent course  Details	ood during preparation, processing an equipment for a limited range of food d evaluating solutions for specific food	nd storage. Identifies with specific purposes. With d purposes. Use lab skill- and usually erroneous  No. of Hours  24  24			
Course Teaching & Learning Activities  Assessment Methods	Lecture v Activitie Lectures Laborato Tutorials	and logical thinking of he guidance factors and us guidance, demonstrates and techniques and an conclusions.  with laboratory componers  Sory  S	e changes that take place in variety of fees some appropriate techniques and elimited skills in designing, producing and alysis of data and results ineffectively ent course  Details	ood during preparation, processing an equipment for a limited range of food d evaluating solutions for specific food	nd storage. Identifies with specific purposes. With d purposes. Use lab skills and usually erroneous  No. of Hours  24  24  6			
Course Teaching Learning Activities Assessment Methods	Lecture v Activitie Lectures Laborato Tutorials Reading	and logical thinking of he guidance factors and us guidance, demonstrates and techniques and an conclusions.  with laboratory componers  s  ory  / Self study	e changes that take place in variety of fees some appropriate techniques and essential experience of details in designing, producing and alysis of data and results ineffectively ent course  Details  laboratory/field trip/seminar	ood during preparation, processing an equipment for a limited range of food d evaluating a limited ronge of food y, leading generally to inappropriate	nd storage. Identifies with -specific purposes. With d purposes. Use lab skills and usually erroneous  No. of Hours  24  24  6  100  Assessment Methods			
Course Teaching Learning Activities Assessment Methods	Lecture v Activitie Lectures Laborato Tutorials Reading Methods	and logical thinking of he guidance factors and us guidance, demonstrates and techniques and an conclusions.  with laboratory componers  s  ory  / Self study	e changes that take place in variety of fees some appropriate techniques and essential experience of details in designing, producing and alysis of data and results ineffectively ent course  Details  laboratory/field trip/seminar	ood during preparation, processing an equipment for a limited range of food de evaluating solutions for specific food, leading generally to inappropriate  Weighting in final course grade (%)	nd storage. Identifies with specific purposes. With purposes. Use lab skill purposes. Use lab skill and usually erroneous  No. of Hours  24  24  6  100  Assessment Methods to CLO Mapping			
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lecture v Activitie Lectures Laborato Tutorials Reading Methods  Examina Laborato Food Pro	and logical thinking of he guidance factors and us guidance, demonstrates is and techniques and an conclusions.  with laboratory componences  solvy	e changes that take place in variety of fees some appropriate techniques and essential experience of details in designing, producing and alysis of data and results ineffectively ent course  Details  laboratory/field trip/seminar	weighting in final course grade (%)	nd storage. Identifies with I-specific purposes. With Id purposes. Use lab skillis and usually erroneous  No. of Hours  24  24  6  100  Assessment Methods to CLO Mapping CLO 1,2,3			
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials Course Website	Lecture v Activitie Lectures Laborato Tutorials Reading Methods  Examina Laborato Food Pro Unit Ope	and logical thinking of he guidance factors and us guidance, demonstrates is and techniques and an conclusions.  with laboratory componences  solvy	changes that take place in variety of fees some appropriate techniques and essential content of the content of	weighting in final course grade (%)	nd storage. Identifies with I-specific purposes. With Id purposes. Use lab skillis and usually erroneous  No. of Hours  24  24  6  100  Assessment Methods to CLO Mapping CLO 1,2,3			

BIOL4207	Meat a	and dairy	sciences (	6 credits	s)				Academic Year	2017	
Offering Department	Biologic	gical Science	es						Quota	50	
Course Co-ordinator	Prof N F	I P Shah, Bi	ological Scien	ices (npsh	ah@hku.	hk)					
Teachers Involved											
Course Objectives		e students ssing and m		rstanding	of moder	n practi	ce and te	chnologies	used in meat and	dairy pro	oductio
Course Contents & Topics	carcass	ss inspectio	on; meat pres	servation	and safe	ety; sen	sory qua	lity of mea	ding of farm anima at. Dairy process leat and dairy prod	ing emp	hasizin
Course Learning	On succ	ccessful co	mpletion of this	s course, s	students	should b	e able to:		• •		
Outcomes	CLO 1	1 understar	d modern pra	ctices in m	neat and	dairy pro	oduction				
			ate a knowledo sing, preservat						quality, and the t	echnolog	jies use
	CLO 3	3 demonstra	ate knowledge	of selecte	ed issues	related	to meat a	nd dairy sa	fety		
Pre-requisites (and Co-requisites and Impermissible combinations)		in BIOL3201									
Offer in 2017 - 2018	N C		18 - 2019 : N						Examination		
Grade Descriptors (A+ to F)	A	evidend analysis	e of creative abil	lity and comp ults to draw a	petence in appropriate	professior and insig	nal-level pro	blem solving.	and critical abilities and Critically use lab skills orld problems. Demor	and techn	niques an
	В	thinking data a	with some evide	nce of comp aw generally	etence in p y appropria	rofessiona	al-level prob	lem solving. U	analytical and critica se lab skills and techrolems. Demonstrate e	iques and	analysis (
	С	and log data ar	ical thinking with I	limited comp v moderately	etence in p appropriat	rofessiona e but son	al-level prob netimes erro	lem solving. L oneous conclu	ne evidence of analytic lse lab skills and techr sions to real-world pr	iques and	analysis (
	D	Demons evidend techniq	strate partial but lee of coherent an	limited grasp nd logical thi s of data and	o, with reter inking, but d results to	ntion of so lacking co draw so	ome relevan ompetence metimes ap	t information, in professiona propriate but	of the subject matter I-level problem solving often erroneous conductions of the conduction of the subject to t	g. Use lab	skills an
	Fail	Demon	strate little or no o	grasp, with re	etention of	little relev	ant informat	ion, of the sub	pject matter covered. S Use lab skills and tech		

		effectively, leading generally to inappetiveness team-based organizational a	propriate and usually erroneous conclusions nd presentational skills.	to real-world problems.
Course Type	Lecture with laboratory com	ponent course		
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			24
	Laboratory			24
	Tutorials			6
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examination		80	CLO 1,2,3
	Laboratory reports		20	CLO 1,2
Required/recommended reading and online materials	Lawrie's Meat Science. RA Dairy Processing and Quali		A Kilara, N Shah (Eds) (Blackwell, 200	08)
Course Website	http://moodle.hku.hk/			
Additional Course Information	This course will be offered s	subject to a minimum enrollme	nt number and availability of teachers	<b>S</b> .

BIOL4208	Meat, da	iry and grain sc	iences (6 credits)	Academic Y	ear 2017		
Offering Department	Biological		, ,	Quota	15		
Course Co-ordinator	Prof N P S	Shah, Biological Sci	ences (npshah@hku.hk)	'			
Teachers Involved	(Dr J C Y I	Lee,School of Biolo	igcal Science)				
		Shah,School of Biol					
Course Objectives			0 1	nd technologies used in agricultu	ire products includin		
			ion, processing and marketing.				
Course Contents				election and breeding of farm ar			
& Topics	fermented	products such as		ry quality of meat. Dairy proc nd health effects. Grain product and grain product marketing.			
Course Learning	On succes	ssful completion of t	his course, students should be a	able to:			
Outcomes	CLO 1 un	derstand modern p	ractices in meat, dairy and grain	production			
			edge and understanding of meat vation or improvement of meat a	and dairy sensory quality, and the	ne technologies use		
			ge of selected issues related to				
			ology behind the production of g	, ,			
Pre-requisites			101 and any level 3 BIOL course				
(and Co-requisites			ssed in BIOL3210; and	,, aa			
and Impermissible		idents who have pa					
combinations)							
Offer in 2017 - 2018	Y 2nd	sem Offer in 201		Examination			
Grade Descriptors (A+ to F)	A	evidence of creative a analysis of data and re	ability and competence in professional-le	how strong analytical and critical abilities evel problem solving. Critically use lab I conclusions to real-world problems. De	skills and techniques an		
	В						
	C Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.						
	D	Demonstrate partial be evidence of coherent techniques and analy	ut limited grasp, with retention of some and logical thinking, but lacking comp	relevant information, of the subject ma etence in professional-level problem so times appropriate but often erroneous	olving. Use lab skills and		
	Fail	Demonstrate little or n and logical thinking, ar data and results ineff	o grasp, with retention of little relevant nd minimal competence in professional-le	information, of the subject matter covere evel problem solving. Use lab skills and t riate and usually erroneous conclusions	echniques and analysis		
Course Type	Lecture wi	th laboratory compo	onent course				
Course Teaching	Activities	<b>.</b>	Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborator	У			24		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinati	ion		70	CLO 1,2,3,4		
	Laborator			30	CLO 1,2,3		
Required/recommended			awrie (CRC Press, 2006)				
reading and			, ,	ara, N Shah (Eds) (Blackwell, 20	(80)		
online materials			e, edited by Wrigley CW, Corke		,		
Course Website		dle@hku.hk	, , , , , , , , , , , , , , , , , , ,	,			
Additional Course			pjected to a minimum enrollment	number and availability of teace	hre		

BIOL4209	Functional foods (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	40
Course Co-ordinator	Dr M F Wang, Biological Sciences (mfwang@hku.hk)		

Teachers Involved	(Dr M F V	Vang,Biological Sciences	s)				
Course Objectives	emphasis			merging functional food/nutraceuti uality control of healthy ingredient			
Course Contents & Topics	nutraceut fibers as containing	icals based on their ch healthy food ingredier	emical structures; unsatur nts; health benefits of di s and prebiotics; small ber	nd nutraceuticals; classification of rated fatty acids, proteins, food p etary phenolics, terpenes, phyto ries, spices, teas and herbs for h	igments and dietary sterols and sulphur		
Course Learning Outcomes	CLO 1 ut CLO 2 ht CLO 3 bt CLO 4 dt	nderstand the definition ave substantial chemica e able to describe exam emonstrate understandii	I knowledge of functional for ples of functional foods an ng of the current functional	able to: nctional foods and nutraceuticals ood and nutraceutical products d interpret critically their claimed he food and nutraceutical industry uality control and manufacturing o			
Pre-requisites (and Co-requisites and Impermissible combinations)		IOL3201 or BIOL3202	aco and teemlologics for e	dulity control and mandidetaining o	Thealthy products		
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2	019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	evidence of creative ability	and competence in professional	Show strong analytical and critical abilities level problem solving. Critically use knowl rate highly effective team-based organiza	edge to draw appropriate		
	В						
	С	and logical thinking with appropriate but sometimes organizational and presenta	limited competence in professi s erroneous conclusions to rea ational skills.	atter covered. Show some evidence of ana onal-level problem solving. Use knowled l-world problems. Demonstrate moderate	ge to draw moderately ly effective team-based		
	D	evidence of coherent and lo	ogical thinking, but lacking compe often erroneous conclusions to	ne relevant information, of the subject matetence in professional-level problem solving real-world problems. Demonstrate team-	g. Use knowledge to draw		
	Fail	Demonstrate little or no gra and logical thinking, and	asp, with retention of little relevar minimal competence in profess and usually erroneous conclusion	It information, of the subject matter covere onal-level problem solving. Use knowled is to real-world problems. Demonstrate inc	ge ineffectively, leading		
Course Type	Lecture-b	ased course					
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials		tutorials/seminars		12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		30	CLO 1,2,3,4,5		
	Examinat	tion		70	CLO 1,2,3,4,5		
reading and				al Foods (CRC Press, 2007) icals: a Global Perspective (IFT Pr	ess, 2005)		
	lattice (III)	alla blocklet					
online materials Course Website Additional Course		odle.hku.hk/	AA - a mala lasa mara a mara U	number and availability of teachers			

BIOL4210	Food pro	oduct development (6 credits) Academic Y	ear	2017
Offering Department	Biological S	Sciences Quota		40
Course Co-ordinator	Dr M F Wa	ng, Biological Sciences (mfwang@hku.hk)		
Teachers Involved	(Dr M F Wa	ang,Biological Sciences)		
Course Objectives		ce the key concepts and techniques used in food product development. To in the design, development and production of a new food product.	orovi	ide small group
Course Contents & Topics	developme	d future of the food industry; industrial product development process; idea general for new food products; quality management and legal protection; marketing strange design; new product development for different food industries.		
Course Learning	On success	sful completion of this course, students should be able to:		
Outcomes	CLO 1 un	derstand the food product development cycle		
	CLO 2 kn	ow the key steps in new product development		
	CLO 3 de	monstrate enhanced insight and understanding of current and future trends in the f	ood i	industry
	CLO 4 ha	ive professional level practical experience in new product development		
	CLO 5 kn	ow the main characteristics of different sectors of the food industry		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIC	DL3203 or BIOL4205		
Offer in 2017 - 2018	N Offe	r in 2018 - 2019 : N Examination	1	
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilitie evidence of creative ability and competence in professional-level problem solving. Critically use lab analysis of data and results to draw appropriate and insightful conclusions to real-world problems. De team-based organizational and presentational skills.	skills	and techniques and
	В	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and c thinking with some evidence of competence in professional-level problem solving. Use lab skills and f data and results to draw generally appropriate conclusions to real-world problems. Demonstrational and presentational skills.	echnic	ques and analysis of

	a d	nd logical thinking with limi ata and results to draw m	complete grasp of the subject matter covered. Sted competence in professional-level problem soderately appropriate but sometimes erroneoussed organizational and presentational skills.	olving. Use lab skills and tecl	nniques and analysis of	
	e te	vidence of coherent and le echniques and analysis of	ted grasp, with retention of some relevant info ogical thinking, but lacking competence in pro- data and results to draw sometimes approp n-based organizational and presentational skills	ofessional-level problem solvi riate but often erroneous co	ng. Use lab skills and	
	a d	nd logical thinking, and min ata and results ineffective	sp, with retention of little relevant information, of imal competence in professional-level problem by, leading generally to inappropriate and usu team-based organizational and presentational	solving. Úse lab skills and tec ally erroneous conclusions t	hniques and analysis of	
Course Type	Laboratory a	nd workshop course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Laboratory				48	
	Group work		80-100 hours group project work		100	
	Tutorials		10 lectures + 12 tutorials		22	
	Reading / Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments	S	assessment of group product development project including inclass presentation	80	CLO 1,2,3,4,5	
	Test			20	CLO 1,2,3,4,5	
Required/recommended reading and online materials	E. Graf and I	. S. Saguy: Food Prod	ping New Food Products for a Changi duct Development (Avi Books, 1991) evelopment (CRC Press, 2005)	ng Marketplace (CRC P	ress, 2007)	
Course Website	http://moodle	e.hku.hk/	•			
Additional Course Information	This course	will be offered subject	to a minimum enrollment number and	availability of teachers.		

BIOL4301	Fish and	fisheries (6 cre	dits)				Academic Year	2017
Offering Department	Biological						Quota	40
Course Co-ordinator	Prof Y J S	adovy, Biological Sc	ciences	(visadovy@hi	ku.hk)			
Teachers Involved	(Prof Y J S	Sadovy, Biological So	ciences	)	,			
Course Objectives	abiotic asp - to provious fishery ma - to cover	int students with the cts of their enviror an understanding nagement challenge the theoretical and plobal, regional and global.	nment for g of hor es, sust practica	or an understa w species div tainable supply al aspects of n	nding of popersity and se	ulation dynami lected aspects and the conser	cs and multispecie of their life histor vation of threatene	s interactions. y are relevant to ed species.
Course Contents & Topics	marine an fisheries; f roles of n management	n to course: phylogod freshwater fish a sish stock assessmen ariculture and capent and fish conserver; climate change a	essemblent and pture fivation. (	ages. Fishery fishery manag sheries for se Conclusion: fis	theory; how ement praction eafood supply h biodiversity	do fisheries wes using local and relation	ork? Status of the regional and glob ship to capture fi	e world's capture al examples. The isheries. Fishery
Course Learning	On succes	sful completion of the	his cou	rse, students s	hould be able	to:		
Outcomes	CLO 2 ap	derstand the basis of preciate the direct ecies assemblages	and in	direct impacts	and conseq	uences of hur	•	
	ma	derstand of the fu anagement						•
	CLO 4 appreciate the mutual dependency of humans with fished populations in relation to their long-term sustainability							
	su	stainability				p-p		
	Su CLO 5 en	stainability hance the ability for	r critical					
(and Co-requisites and Impermissible	CLO 5 en	stainability	r critical					Ţ.
(and Co-requisites and Impermissible combinations)	CLO 5 en	stainability hance the ability for OL3301 or BIOL330 sem Offer in 2018	r critical 03 8 - 2019	and synthetic	thinking		Examination	Мау
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	CLO 5 en	stainability hance the ability for OL3301 or BIOL330  sem Offer in 2018 Demonstrate thorough outcomes. Show strong and synthesize informa highly effective present Demonstrate substantilearning outcomes. Sh apply knowledge to fe	8 - 2019 mastery g analytic ation, and tational sliat all commariow evide amiliar ar	and synthetic  9: N at an advanced leal and critical ab d ability to apply k kills. Strong evide and of a broad ra ence of analytical nd some unfamili	thinking  evel of extensive lilities and logical nowledge to a w nce of clear atter nge of knowledg and critical abilit	knowledge and si thinking, with evi ide range of comp tion to thoughtful a e and skills regulation	<b>Examination</b> kills required for attainir  dence of original thougl  lex, familiar and unfam	ng all course learning ht, ability to integrate illiar situations. Apply at most of the course aterials and ability to
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	CLO 5 en Pass in BI  Y 2nd	stainability hance the ability for OL3301 or BIOL330  sem Offer in 2018 Demonstrate thorough outcomes. Show strong and synthesize informa highly effective present Demonstrate substantilearning outcomes. Show apply knowledge to fe attention to thoughtful a Demonstrate general in Outcomes. Show evide	8 - 2019 8 - 2019 g analytic ation, and tational sl aid committe iow evide amiliar ar and reflec but incor	and synthetic  9: N at an advanced leal and critical ab al and critical ab (still). Strong evide and of a broad ra ence of analytical and some unfamili stive thinking. mplete command ome analytical ar	thinking  evel of extensive lities and logical nowledge to a w nce of clear atter nge of knowledg and critical abilit ar situations. Do of knowledge a d critical abilities	knowledge and si thinking, with evid ide range of comp tion to thoughtful a e and skills requi- ies and logical thi emonstrate effecti nd skills required and logical think	Examination kills required for attainir dence of original thougl lex, familiar and unfam and reflective thinking. red for attaining at leas nking, integration of m	ng all course learning ht, ability to integrate hilliar situations. Apply st most of the course atterials and ability to s. Evidence of clear the course learning y knowledge to most
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	CLO 5 en Pass in BI  Y 2nd A  B	stainability hance the ability for OL3301 or BIOL330  Sem Offer in 2018 Demonstrate thorough outcomes. Show strong and synthesize informa highly effective present Demonstrate substantil learning outcomes. Sh apply knowledge to fa attention to thoughtful a tention to thoughtful a Demonstrate general l outcomes. Show evide familiar situations. App thinking. Demonstrate partial bu Show evidence of sor integration. Show limite attention to thoughtful a	8 - 2019 mastery g analytic ation, and tational sl aid commission ow evide amiliar ar and reflect but incor ence of s oly moder ut limited me cohe ed ability and reflect	and synthetic  9:N at an advanced lead and critical ab a ability to apply k wills. Strong evide and of a broad ratence of analytical and some unfamilistive thinking. mplete command ome analytical arrately effective precommand of knowent and logical to apply knowledgetive thinking.	evel of extensive lities and logical nowledge to a ware of clear atterned of knowledge and critical abilities ar situations. Do of knowledge ad critical abilities esentational skills wheeldge and skills thinking, but with the to solve proble	knowledge and si thinking, with evi- ide range of comp tion to thoughtful a e and skills requi- ies and logical thi emonstrate effecti and logical think Little evidence of required for attain limited analytica ms. Apply limited	Examination  kills required for attaining dence of original though lex, familiar and unfammend reflective thinking. The for attaining at leas nking, integration of move presentational skills for attaining most of ing, and ability to apply of clear attention to thouse the course and and critical abilities effectiveness in presentations.	ng all course learning tht, ability to integrate illiar situations. Apply at most of the course aterials and ability to a Evidence of clear the course learning y knowledge to most ughtful and reflective e learning outcomes and little attempt at tational skills. Lack o
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	CLO 5 en Pass in BI  Y 2nd A  B	stainability hance the ability for OL3301 or BIOL330  sem Offer in 2018 Demonstrate thorough outcomes. Show strong and synthesize informat highly effective present Demonstrate substantilearning outcomes. Show learning outcomes. Show apply knowledge to fa attention to thoughtful at Demonstrate general I Demonstrate general I Demonstrate partial bu Show evidence of sor integration. Show limite attention to thoughtful at Demonstrate little or no Demonstrate little or no	8 - 2019 mastery g analytic attion, and tational slial common we wide amiliar and reflect but incorence of soly moder at limited me cohered ability and reflect o evidence al abilities.	and synthetic  9: N at an advanced lead and critical abdition and synthetic and a record and far an advanced lead and far an artiful and some unfamiliative thinking.  In the synthesis of the synthesis of an analytical arriately effective procommand of known and logical to apply knowledge title thinking.  The synthesis of the sy	evel of extensive ilities and logical nowledge to a wore of clear atternge of knowledge and critical abilitiar situations. Do of knowledge and critical abilities exentational skills whedge and skills when the company of the company	knowledge and si thinking, with evi- ide range of comp ide range of comp ies and skills requi- ies and logical think emonstrate effecti nd skills required and logical think i. Little evidence of required for attain in limited analytica ms. Apply limited skills required for a Show very little	Examination  kills required for attaining dence of original thoughex, familiar and unfam and reflective thinking, red for attaining at leas nking, integration of may be presentational skills for attaining most of ing, and ability to apply of clear attention to tho ning some of the coursel and critical abilities effectiveness in presentationing the course leas or no ability to apply	ng all course learning ht, ability to integrate illiar situations. Apply st most of the course atterials and ability to s. Evidence of clear the course learning y knowledge to most ughtful and reflective e learning outcomes and little attempt at tational skills. Lack o rming outcomes. Lack
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	CLO 5 en Pass in BI  Y 2nd A  B  C	sem Offer in 2018 Demonstrate thorough outcomes. Show strong and synthesize informatingly effective present Demonstrate substantilearning outcomes. Shapply knowledge to fattention to thoughtful a Demonstrate general outcomes. Show evide familiar situations. App thinking. Demonstrate partial bu Show evidence of sor integration. Show limite attention to thoughtful a Demonstrate little or not analytical and critic	8 - 2019 mastery g analytic attion, and tational slial common we wide amiliar and reflect but incorence of soly moder at limited me cohered ability and reflect o evidence al abilities.	and synthetic  9: N at an advanced lead and critical abdition and synthetic and a record and far an analytical and some unfamilitive thinking.  In the synthetic and synthetic and logical to apply knowledge the synthetic and synthe	evel of extensive ilities and logical nowledge to a wore of clear atternge of knowledge and critical abilitiar situations. Do of knowledge and critical abilities exentational skills whedge and skills when the company of the company	knowledge and si thinking, with evi- ide range of comp ide range of comp ies and skills requi- ies and logical think emonstrate effecti nd skills required and logical think i. Little evidence of required for attain in limited analytica ms. Apply limited skills required for a Show very little	Examination  kills required for attaining dence of original thoughex, familiar and unfam and reflective thinking, red for attaining at leas nking, integration of may be presentational skills for attaining most of ing, and ability to apply of clear attention to tho ning some of the coursel and critical abilities effectiveness in presentationing the course leas or no ability to apply	ng all course learning ht, ability to integrate illiar situations. Apply st most of the course atterials and ability to s. Evidence of clear the course learning y knowledge to most ughtful and reflective e learning outcomes and little attempt at tational skills. Lack o rming outcomes. Lack
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	CLO 5 en Pass in BI  Y 2nd A  B  C	stainability hance the ability for OL3301 or BIOL330  sem Offer in 2018 Demonstrate thorough outcomes. Show strong and synthesize informa highly effective present Demonstrate substantilearning outcomes. Sho apply knowledge to attention to thoughtful a Demonstrate general outcomes. Show evide familiar situations. App thinking. Demonstrate partial bu Show evidence of sor integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critic problems. Organization used course	8 - 2019 mastery g analytic attorn and reflec but incorence of soly moder ut limited me coher ed ability and reflec o evidenc cal abilitie n and pre-	and synthetic  9: N at an advanced lead and critical abdition and synthetic and a record and far an analytical and some unfamilitive thinking.  In the synthetic and synthetic and logical to apply knowledge the synthetic and synthe	evel of extensive ilities and logical nowledge to a wore of clear atternge of knowledge and critical abilitiar situations. Do of knowledge and critical abilities exentational skills whedge and skills when the company of the company	knowledge and si thinking, with evi- ide range of comp ide range of comp ies and skills requi- ies and logical think emonstrate effecti nd skills required and logical think i. Little evidence of required for attain in limited analytica ms. Apply limited skills required for a Show very little	Examination  kills required for attaining dence of original thoughex, familiar and unfam and reflective thinking, red for attaining at leas nking, integration of may be presentational skills for attaining most of ing, and ability to apply of clear attention to tho ning some of the coursel and critical abilities effectiveness in presentationing the course leas or no ability to apply	ng all course learning ht, ability to integrate illiar situations. Apply st most of the course atterials and ability to s. Evidence of clear the course learning y knowledge to most ughtful and reflective e learning outcomes and little attempt at tational skills. Lack o rming outcomes. Lack

	Field work	Field, laboratory, practica	l and tutorials	36			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		30	CLO 1,2,3,4,5			
	Examination		60	CLO 1,2,3,4,5			
	Test		10	CLO 3			
Required/recommended reading and	Hart P. J. B. & Reynolds J. D. (eds Science Ltd, 2002)	s): Handbook of Fish Biolog	gy and Fisheries (Volumes 1 & 2, E	Blackwell			
online materials	G. Helfman, B. Collette and D. Facey: The Diversity of Fishes (Blackwell Science, 1997)						
Course Website	http://www.biosch.hku.hk/ecology/	http://www.biosch.hku.hk/ecology/lsc/					
Additional Course	Offer in alternate year from 2017-2	Offer in alternate year from 2017-2018					
Information	This course will be offered subject	to a minimum enrollment r	number and availability of teachers	i.			

BIOL4302	Environ	mental impact asse	ssment (6 credits)	Academic Ye	ar 2017		
Offering Department	Biological	Sciences		Quota	30		
Course Co-ordinator	Dr B D Ru	ussell, Biological Science	es (brussell@hku.hk)				
Teachers Involved	(Dr B D R	ussell,Biological Science	es)				
	(Dr C H H	lau, Biological Sceinces)	•				
	(Prof K M	Y Leung, Biological Scie	ences)				
Course Objectives		To introduce the general principles, processes, techniques, current practices and problems of environmental mpact assessment (EIA).					
Course Contents & Topics	legislation remediation Common EIA instru	Background and history of EIA development. Concept of carrying capacity and precautionary principle. EIA egislation. Processes in conducting EIA. Risk assessment and management. Mitigatory measures and emediation. Cost benefit analysis. Socio-economic perspectives and analysis. Project monitoring and audit. Common techniques employed in EIA (e.g. matrix, sequence diagram, causal chain analysis, modeling). Modern EIA instruments (environmental liability, environmental insurance and environmental share). Application of EIA in environmental management. Case studies. Role play exercise.					
Course Learning	On succe	ssful completion of this of	course, students should be able	to:			
Outcomes	CLO 1	understand the operation	n of EIA systems in Hong Kong	and overseas			
	CLO 2	apply a variety of technic	ques in assessing environmenta	ıl impact			
	CLO 3	evaluate different options	s and determine acceptability in	environmental impact assess	ment		
		prepare EIA reports for s					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (E	BIOL2103 or BIOL2306); 04 or any BIOL3XXX coi	and				
Offer in 2017 - 2018	Y 2nd	d sem Offer in 2018 - 2	2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course						
	В		mmand of a broad range of knowledg	e and skills required for attaining at	least most of the course		
	С	learning outcomes. Show e apply knowledge to familia attention to thoughtful and roughtful and rough	ommand of a broad range of knowledg evidence of analytical and critical abiliti ar and some unfamiliar situations. De	e and skills required for attaining at es and logical thinking, integration o emonstrate effective presentational s and skills required for attaining most	least most of the course f material sand ability to skills. Evidence of clear of the course learning		
	С	learning outcomes. Show e apply knowledge to familia attention to thoughtful and ru Demonstrate general but in outcomes. Show evidence familiar situations. Apply muthinking.	ommand of a broad range of knowledg evidence of analytical and critical abilitia ar and some unfamiliar situations. De eflective thinking. ncomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills	e and skills required for attaining at es and logical thinking, integration o emonstrate effective presentational s and skills required for attaining most and logical thinking, and ability to a building to be . Little evidence of clear attention to	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to mos thoughtful and reflective		
		learning outcomes. Show e apply knowledge to familia attention to thoughtful and ru Demonstrate general but in outcomes. Show evidence familiar situations. Apply multiniking.  Demonstrate partial but limi Show evidence of some c integration. Show limited ab attention to thoughtful and ru	emmand of a broad range of knowledg evidence of analytical and critical abilitia ar and some unfamiliar situations. De effective thinking. ncomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills itted command of knowledge and skills coherent and logical thinking, but with lilly to apply knowledge to solve proble effective thinking.	e and skills required for attaining at es and logical thinking, integration o emonstrate effective presentational s and skills required for attaining most and logical thinking, and ability to a Little evidence of clear attention to required for attaining some of the co limited analytical and critical abilit ms. Apply limited effectiveness in pre	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to mos thoughtful and reflective surse learning outcomes ies and little attempt at sentational skills. Lack o		
	C D	learning outcomes. Show e apply knowledge to familia attention to thoughtful and ru Demonstrate general but in outcomes. Show evidence familiar situations. Apply me thinking.  Demonstrate partial but limi Show evidence of some contegration. Show limited ab attention to thoughtful and ru Fail Demonstrate little or Lack of analytical and critic problems. Organization and	ammand of a broad range of knowledge evidence of analytical and critical abilitizar and some unfamiliar situations. Desertlective thinking.  Incomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills itted command of knowledge and skills coherent and logical thinking, but with solitiy to apply knowledge to solve proble effective thinking.  In evidence of command of knowledge and abilities, logical and coherent thinking are presentational skills are minimally effectives.	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stands and skills required for attaining most and logical thinking, and ability to a substand the configuration of the config	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to mos thoughtful and reflective burse learning outcomes ies and little attempt at sentational skills. Lack or burse learning outcomes		
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Course Teaching	C D	learning outcomes. Show e apply knowledge to familia attention to thoughtful and ru Demonstrate general but in outcomes. Show evidence familiar situations. Apply me thinking.  Demonstrate partial but limi Show evidence of some cintegration. Show limited ab attention to thoughtful and ru Fail Demonstrate little or not Lack of analytical and critic problems. Organization and rith laboratory components.	ammand of a broad range of knowledge evidence of analytical and critical abilitizar and some unfamiliar situations. Desertlective thinking.  Incomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills itted command of knowledge and skills coherent and logical thinking, but with solitiy to apply knowledge to solve proble effective thinking.  In evidence of command of knowledge and abilities, logical and coherent thinking are presentational skills are minimally effectives.	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stands and skills required for attaining most and logical thinking, and ability to a substand the configuration of the config	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to mos thoughtful and reflective burse learning outcomes ies and little attempt at sentational skills. Lack or burse learning outcomes		
Course Teaching	C D Fail Lecture w	learning outcomes. Show e apply knowledge to familia attention to thoughtful and ru Demonstrate general but in outcomes. Show evidence familiar situations. Apply me thinking.  Demonstrate partial but limi Show evidence of some cintegration. Show limited ab attention to thoughtful and ru Fail Demonstrate little or not Lack of analytical and critic problems. Organization and rith laboratory components.	emmand of a broad range of knowledge evidence of analytical and critical abilitizar and some unfamiliar situations. Desertlective thinking.  Incomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills itted command of knowledge and skills itted command of knowledge and skills itted command logical thinking, but with solitity to apply knowledge to solve proble effective thinking.  In evidence of command of knowledge and abilities, logical and coherent thinking presentational skills are minimally effect to course	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stands and skills required for attaining most and logical thinking, and ability to a substand the configuration of the config	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to mos thoughtful and reflective ourse learning outcomes leas and little attempt at sentational skills. Lack of ourse learning outcomes pply knowledge to solve the course learning outcomes pourse learning outcomes pour solve learning outcomes are solved learning learning outcomes are solved learning learn		
Course Teaching	C D Fail Lecture w Activities	learning outcomes. Show e apply knowledge to familia attention to thoughtful and ru Demonstrate general but in outcomes. Show evidence familiar situations. Apply me thinking.  Demonstrate partial but limi Show evidence of some cintegration. Show limited ab attention to thoughtful and ru Fail Demonstrate little or no Lack of analytical and critic problems. Organization and rith laboratory components	emmand of a broad range of knowledge evidence of analytical and critical abilitizar and some unfamiliar situations. Desertlective thinking.  Incomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills itted command of knowledge and skills itted command of knowledge and skills itted command logical thinking, but with solitity to apply knowledge to solve proble effective thinking.  In evidence of command of knowledge and abilities, logical and coherent thinking presentational skills are minimally effect to course	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stands and skills required for attaining most and logical thinking, and ability to a substand the configuration of the config	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to most thoughtful and reflective burse learning outcomes ies and little attempt at sentational skills. Lack of ourse learning outcomes pply knowledge to solve No. of Hours		
Course Type Course Teaching & Learning Activities	C D Fail Lecture w Activities Lectures Field wor	learning outcomes. Show e apply knowledge to familia attention to thoughtful and ru Demonstrate general but in outcomes. Show evidence familiar situations. Apply me thinking.  Demonstrate partial but limi Show evidence of some cintegration. Show limited ab attention to thoughtful and ru Fail Demonstrate little or no Lack of analytical and critic problems. Organization and rith laboratory components	emmand of a broad range of knowledg evidence of analytical and critical abilitizar and some unfamiliar situations. De effective thinking.  ncomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills ited command of knowledge and skills coherent and logical thinking, but with tillity to apply knowledge to solve proble effective thinking.  a labilities, logical and coherent thinking presentational skills are minimally effective thinking.	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stands and skills required for attaining most and logical thinking, and ability to a substand the configuration of the config	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to mos thoughtful and reflective ourse learning outcomes leas and little attempt at sentational skills. Lack of ourse learning outcomes pply knowledge to solve the course learning outcomes pourse learning outcomes pour solve learning outcomes are solved learning learning outcomes are solved learning learn		
Course Teaching & Learning Activities  Assessment Methods	C D Fail Lecture w Activities Lectures Field wor	learning outcomes. Show e apply knowledge to familia attention to thoughtful and ru Demonstrate general but in outcomes. Show evidence familiar situations. Apply muthinking.  Demonstrate partial but limi Show evidence of some integration. Show limited ab attention to thoughtful and ru Fail Demonstrate little or no Lack of analytical and critic problems. Organization and rith laboratory components  k / Self study	ammand of a broad range of knowledge by dence of analytical and critical abilitia rand some unfamiliar situations. De effective thinking.  ncomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills itted command of knowledge and skills coherent and logical thinking, but with a some analytical problem of the course of command of knowledge is solve proble effective thinking.  Devidence of command of knowledge and abilities, logical and coherent thinking presentational skills are minimally effect to course  Details  field trip / tutorials	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stands and skills required for attaining most and logical thinking, and ability to a substand the configuration of the config	least most of the course f material sand ability to skills. Evidence of clear apply knowledge to mos thoughtful and reflective purse learning outcomes ies and little attempt at sentational skills. Lack of purse learning outcomes poly knowledge to solve the course the cour		
Course Teaching & Learning Activities  Assessment Methods	C D Fail Lecture w Activities Lectures Field wor Reading	learning outcomes. Show e apply knowledge to familia attention to thoughtful and rn Demonstrate general but is outcomes. Show evidence familiar situations. Apply me thinking.  Demonstrate partial but limis Show evidence of some contegration. Show limited ab attention to thoughtful and rr Fail Demonstrate little or not Lack of analytical and critic problems. Organization and rith laboratory components.	emmand of a broad range of knowledge evidence of analytical and critical abilities are and some unfamiliar situations. Deserted thinking.  Incomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills ited command of knowledge and skills coherent and logical thinking, but with a some analytical problem of the course of command of knowledge is solve problem of the course of command of knowledge is all abilities, logical and coherent thinking or evidence of command of knowledge is all abilities, logical and coherent thinking or evidence of command of knowledge is all abilities, logical and coherent thinking or evidence of command of knowledge in the course of the cour	e and skills required for attaining at es and logical thinking, integration o emonstrate effective presentational s and skills required for attaining most and logical thinking, and ability to a Little evidence of clear attention to required for attaining some of the contimited analytical and critical abilitims. Apply limited effectiveness in present skills required for attaining the cong. Show very little or no ability to active or ineffective.  Weighting in final	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to most thoughtful and reflective ourse learning outcomes less and little attempt at sentational skills. Lack of ourse learning outcomes poly knowledge to solve the course learning outcomes the course learning		
Course Teaching & Learning Activities  Assessment Methods	C D Fail Lecture w Activities Lectures Field wor Reading Methods Assignme	learning outcomes. Show e apply knowledge to familia attention to thoughtful and rn Demonstrate general but in outcomes. Show evidence familiar situations. Apply me thinking.  Demonstrate partial but limis Show evidence of some contegration. Show limited ab attention to thoughtful and rr Fail Demonstrate little or not Lack of analytical and critic problems. Organization and rith laboratory components.	emmand of a broad range of knowledge evidence of analytical and critical abilities are and some unfamiliar situations. Deserted thinking.  Incomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills ited command of knowledge and skills coherent and logical thinking, but with a some analytical problem of the course of command of knowledge is solve problem of the course of command of knowledge is all abilities, logical and coherent thinking or evidence of command of knowledge is all abilities, logical and coherent thinking or evidence of command of knowledge is all abilities, logical and coherent thinking or evidence of command of knowledge in the course of the cour	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stand logical thinking, and ability to a . Little evidence of clear attention to required for attaining some of the continuited analytical and critical ability ms. Apply limited effectiveness in present stands are continuited analytical and critical ability ms. Apply limited effectiveness in present stands where the continuity of the continuity	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to most thoughtful and reflective tourse learning outcomes learning outcomes learning outcomes learning outcomes phy knowledge to solve the course learning outcomes to course learning outcomes the course learning outcomes to course learn		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  Lecture w Activities Lectures Field wor Reading Methods  Assignme Examinat J. Glasso 2005) HKSAR (HKSAR G	learning outcomes. Show e apply knowledge to familia attention to thoughtful and run Demonstrate general but in outcomes. Show evidence familiar situations. Apply mutiniking.  Demonstrate partial but limi Show evidence of some integration. Show limited ab attention to thoughtful and run Fail Demonstrate little or no Lack of analytical and critic problems. Organization and rith laboratory components.  k / Self study  ents tion un, R. Therivel & A. Cha	ommand of a broad range of knowledge vidence of analytical and critical abilitic ar and some unfamiliar situations. De effective thinking.  ncomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills ited command of knowledge and skills otherent and logical thinking, but with effective thinking.  Devidence of command of knowledge is all abilities, logical and coherent thinkil presentational skills are minimally effective tourse  Details  field trip / tutorials student center learning  Details  adwick: Introduction to Environ  Memorandum for Environmen	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stand skills required for attaining most and logical thinking, and ability to a clittle evidence of clear attention to required for attaining some of the contimited analytical and critical abilities. Apply limited effectiveness in preamd skills required for attaining the cong. Show very little or no ability to a citive or ineffective.  Weighting in final course grade (%)  50  50  mental Impact Assessment, (	least most of the course f material sand ability to skills. Evidence of clear ing pply knowledge to most thoughtful and reflective purse learning outcomes learning outcomes learning outcomes learning outcomes learning outcomes learning outcomes pply knowledge to solve the purse provided the purse provi		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Fail  Lecture w Activities Lectures Field wor Reading Methods  Assignme Examinat J. Glasso 2005) HKSAR (HKSAR (HKSAR (Reference	learning outcomes. Show e apply knowledge to familia attention to thoughtful and run Demonstrate general but in outcomes. Show evidence familiar situations. Apply me thinking.  Demonstrate partial but limis Show evidence of some contegration. Show limited ab attention to thoughtful and run Fail Demonstrate little or not Lack of analytical and critic problems. Organization and rith laboratory components.  k / Self study  ents  con, R. Therivel & A. Characteristic of the contegration on the contegration on the contegration on the contegration on the contegration of the contegration on the contegration of the contegration	mmand of a broad range of knowledge vidence of analytical and critical abiliticar and some unfamiliar situations. De effective thinking.  ncomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills ited command of knowledge and skills wherent and logical thinking, but with with the command of knowledge to solve proble effective thinking.  It is evidence of command of knowledge and abilities, logical and coherent thinking presentational skills are minimally effect to course  Details  field trip / tutorials student center learning  Details  adwick: Introduction to Environ  Memorandum for Environmentsses	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stand skills required for attaining most and logical thinking, and ability to a clittle evidence of clear attention to required for attaining some of the contimited analytical and critical abilities. Apply limited effectiveness in preamd skills required for attaining the cong. Show very little or no ability to a citive or ineffective.  Weighting in final course grade (%)  50  50  mental Impact Assessment, (	least most of the course f material sand ability to skills. Evidence of clear ing pply knowledge to most thoughtful and reflective purse learning outcomes learning outcomes learning outcomes learning outcomes learning outcomes learning outcomes pply knowledge to solve the purse provided the purse provi		
Course Teaching	C D Lecture w Activities Lectures Field wor Reading Methods Assignme Examinat J. Glasso 2005) HKSAR G HKSAR G Reference	learning outcomes. Show e apply knowledge to familia attention to thoughtful and ru Demonstrate general but in outcomes. Show evidence familiar situations. Apply me thinking.  Demonstrate partial but limis Show evidence of some contegration. Show limited ab attention to thoughtful and run Fail Demonstrate little or not Lack of analytical and critic problems. Organization and rith laboratory components.  Kk / Self study  ents  tion n, R. Therivel & A. Characteristical covernment: Technical Government, 1998) es: To be provided in claw. biosch.hku.hk/ecology/	mmand of a broad range of knowledge vidence of analytical and critical abiliticar and some unfamiliar situations. De effective thinking.  ncomplete command of knowledge a of some analytical and critical abilities oderately effective presentational skills ited command of knowledge and skills wherent and logical thinking, but with with the command of knowledge to solve proble effective thinking.  It is evidence of command of knowledge and abilities, logical and coherent thinking presentational skills are minimally effect to course  Details  field trip / tutorials student center learning  Details  adwick: Introduction to Environ  Memorandum for Environmentsses	e and skills required for attaining at es and logical thinking, integration of emonstrate effective presentational stands and skills required for attaining most and skills required for attaining most and logical thinking, and ability to a Little evidence of clear attention to required for attaining some of the contimited analytical and critical ability ms. Apply limited effectiveness in present and skills required for attaining the cong. Show very little or no ability to active or ineffective.  Weighting in final course grade (%)  50  50  mental Impact Assessment, (tal Impact Assessment Ordinates and logical transport of the course grade (standard) and the cours	least most of the course f material sand ability to skills. Evidence of clear of the course learning apply knowledge to most thoughtful and reflective burse learning outcomes less and little attempt at sentational skills. Lack of skills skills skills. Lack of skills		

BIOL4303	Animal behaviour (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	30
Course Co-ordinator	Dr L Karczmarski, Biological Sciences (leszek@hku.hk)		
Teachers Involved			

Course Objectives	insights in functions of and other for their you of a popula	This course teaches students the ways and means of exploring and understanding animal behaviour; it provides nsights into a field of science that investigates everything animals do, including the underlying mechanisms and unctions of specific behaviours; the ways in which animals interact with each other, with their physical environment and other organisms; how animals find and defend resources, avoid predators, choose mates, reproduce, and care for their young; how complex animal societies are formed and how behaviour of an individual affects the structure of a population.					
Course Contents & Topics	behaviour How does are some the hunter complex a be explain as possibl the rest of within the behaviour research t	f a population. his course will introduce students to scientific reasoning and conceptual basis of an understanding of animal ehaviour and behavioural ecology. What causes specific behaviour and what are the underlying mechanisms? low does behaviour develop within the individual's lifetime and what functions does it serve? For example; why re some species monogamous while others are polygamous? What makes one organism the hunter and another hunted? Several animal species, including humans, tend to live in groups; social life is among the most complex and effective survival strategy. However, how could, for instance, the birth of sterile castes, like in bees, explained through an evolving mechanism which emphasizes the reproductive success of as many individuals is possible? Why, among animals living in small groups like squirrels, would an individual risk its own life to save he rest of the group? In this course, based upon ecological and evolutionary principles, students will learn to think rithin the paradigm of behavioural ecology and understand the causes, functions, development, and evolution of ehaviour. We will discuss several classical studies that form the foundation of this field, as well as more recent assearch that represents the current concepts which have led to modern understanding of animal behaviour. We rill also illustrate the links between the recent extraordinary advances in behavioural ecology and socio-ecology					
Course Learning Outcomes	On succes CLO 1 lea CLO 2 ap CLO 3 ap CLO 4 lea CLO 5 thi	ssful completion of this co arn to appreciate the cau- preciate the complexity preciate current theories arn the scientific reasoning ink analytically in terms	ourse, students should be able to: uses, functions, development, and evor interactions between environment is that form basis for modern understang and methodology in the field of Air is of behavioural ecology, animal is behaviour contributes to its conservations.	al selective pressures an anding of animal behavio nimal Behaviour ocio-behavioural comple	d animal behaviour ur		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in or Not for stu	idents who have passed	es: BIOL3301, BIOL3313, BIOL3319 in BIOL3101	, BIOL3320 or BIOL3419			
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N		Examination			
Grade Descriptors (A+ to F)	Evidence of a thorough grasp of the subject in a broader comparative perspective as demonstrated by background reading and excellent use of named examples and case studies. Evidence of independent critical thought with excellent use of a broad range of fundamental concepts to draw insightful and logical conclusions. Show eagerness to learn, great abilities of independent work, effective presentation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree level.						
	B Evidence of a good grasp of the subject as demonstrated by some background reading and appropriate use of named examples and some case studies. Evidence of good critical thought, although not necessarily original. Good and very good (but not outstanding) abilities of independent work, effective presentation skills with good analytical and logical argumentation. Good general command of acquired knowledge to draw meaningful and logical conclusions. Work more than sufficient for what is required at degree level.  C Demonstrate an adequate, but not coherent and incomplete grasp of the subject, with limited background reading and limited use						
		of named examples and case studies. Some abilities of logical critical thinking, but not insightful and/or independent; only partia abilities to use acquired knowledge and work independently to draw meaningful conclusions. Fair presentation skills, with mostl correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degre level.					
	Demonstrate some grasp of the subject, but partial and limited to the most basic concepts, examples, and limited (or none) cas studies. Insufficient evidence of background reading, limited abilities of critical independent thinking, and not particularly effective presentation skills with generally weak logical argumentation and restricted ability of drawing appropriate conclusions. Wor barely meets what is required at degree level.  No evidence of basic minimum knowledge and understanding of the subject. No evidence of background reading and not familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentations.						
	skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.						
Course Type		th laboratory component	· · · · · · · · · · · · · · · · · · ·				
Course Teaching & Learning Activities	Activities		Details		No. of Hours		
a Louining Activities	Lectures Laborator	у	including field trips, site visits, inte sessions, classroom debates	24 32			
	Project wo	ork	project work review		8		
	Reading /	Self study			60		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		active participation/continuous assessment/presentation	55	CLO 1,2,3,4,5		
D!	Examinat		 	45	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Bolhuis J.J. & Giraldeau L.A. The Behavior of Animals: Mechanisms, Function, and Evolution (Blackwel Publishing 2005) Danchin E., Giraldeau L-A. & Cezilly F. Behavioural Ecology (Oxford University Press 2008) Dugatkin L.A. Principles of Animal Behavior (2nd edition) (W.W. Norton & Company 2009)						
		•	, , ,	amic Press 2010)			
Course Website	Breed M.D	D. & Moore J. (eds). End	cyclopedia of Animal Behavior (Acade	emic Press 2010)			
Course Website Additional Course	Breed M.D. http://www	•	cyclopedia of Animal Behavior (Acadelsc	emic Press 2010)			

BIOL4304	Ecosystem functioning and services (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	30
Course Co-ordinator	Dr B D Russell, Biological Sciences (brussell@hku.hk)		
Teachers Involved	(Dr B D Russell, Biological Sciences)		
Course Objectives	This course will introduce the functioning of terrestrial, fresh water and marine they provide human populations. The concept of ecosystem services will including financial, cultural, social and, importantly, the intrinsic value that may	be further expand	led into "value",

		an activities degrade the ecosystem services s		nd how protecting ecosystems	and biodiversity can		
Course Contents & Topics	Natural ed services of may be p marine er to human	Natural ecosystems provide trillions of dollars' worth of ecosystem services to humans every year. Many of these services go unrecognized and undervalued. In fact, because humans rely on ecosystems many of these services may be priceless. This course will first cover the function of different ecosystems from terrestrial, fresh water and marine environments. Students will then be introduced to the concept of ecosystem services and what they provide to human populations. Finally, human activities which degrade ecosystems and reduce the extent that ecosystems can provide these services, and what that means for human populations, will be covered.					
Course Learning		n successful completion of this course, students should be able to:					
Outcomes		•	nding of the complexity and				
			provide services which huma				
				e the value of ecosystem services	S		
	da	angers of placing a value	e on nature	s used to calculate the value of	•		
	ed	cosystem services		ies reduce the function of ecosy			
Pre-requisites (and Co-requisites and Impermissible combinations)		one of the following co 04 or ENVS3020	ourses: BIOL3301 or BIOL	3303 or BIOL3313 or BIOL331	9 or ENVS3019 or		
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	019 : N	Examination	Dec		
Grade Descriptors (A+ to F)	A Evidence of a thorough grasp of the subject and relevant research techniques. Eagerness and enthusiasm to learn and excellent familiarity with relevant background reading and case studies. Exemplary handling of field data collection and excellent analytical skills. Ample evidence of independent critical thought with excellent use of a broad range of fundamental concepts and broader comparative perspective to draw insightful and logical conclusions. Show outstanding abilities of independent work, effective presentation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree level.						
	В						
	Demonstrate an adequate, but incomplete grasp of the subject and relevant research techniques. Moderate familiarity with relevant background reading and case studies, but no interest in learning beyond the adequate average level. Evidence of logical critical thinking (although not always independent), with mostly good use of fundamental concepts to draw logical conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.						
	D Demonstrate some grasp of the subject, but only partial and with limited understanding of relevant research concepts and research techniques. Some familiarity with relevant case studies, but insufficient evidence of background reading and limited abilities of critical independent thinking. Ineffective presentation skills with generally weak logical argumentation with restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.						
	Fail  No evidence of basic a minimum grasp of the subject and the minimum relevant research techniques. No evidence of background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.						
Course Type	Lecture-b	ased course					
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials	/ O = 16 = 4d			12		
Annual Mather 1		/ Self study			70		
Assessment Methods and Weighting	Methods	i	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			40	CLO 1,2,3,4,5		
	Examination			40	CLO 1,2,3,4,5		
,	Presenta			20	CLO 1,2,4,5		
Required/recommended reading and online materials	Students	will be directed to releva	nt scientific literature and w	ebsites			
Course Website		v.biosch.hku.hk/ecology/					
Additional Course		Iternate year from 2017-2					
		se will be offered subject					

BIOL4401	Medical microbiology and applied immunology (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota	40			
Course Co-ordinator	Dr W Y Lui, Biological Sciences (wylui@hku.hk)					
Teachers Involved	(Dr A Yan,Biological Sciences) (Dr W Y Lui,Biological Sciences) (Prof W W M Lee,Biological Sciences)					
Course Objectives	The objective is to provide students the knowledge on the practical application biological research, clinical analysis and disease diagnosis.	s of immunology ar	nd microbiology in			
Course Contents & Topics	, , , , , , , , , , , , , , , , , , , ,					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 apply the principles of antigen-antibody interaction in various advanced research techniques  CLO 2 demonstrate knowledge on microbial pathogens, mechanisms for their disease-causing, and principles of					

	l a	antibiotic development					
	CLO 3 understand the scientific principles of various clinical laboratory analyses						
				nfection and the spread of antibiotic re	sistance		
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOL3401 or BIOL3403					
Offer in 2017 - 2018	Y 2n	d sem Offer in 2018 - 2	2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	outcomes. Show strong and knowledge to a wide range	alytical and critical abilities a of complex, familiar and unfa	of extensive knowledge required for attaining nd logical thinking, with evidence of original the amiliar situations. Apply highly effective lab skill ful conclusions. Apply highly effective organiza	bught, and ability to apply is and techniques. Critical		
	В	outcomes. Show evidence some unfamiliar situations.	of analytical and critical abil	f knowledge required for attaining at least mo ities and logical thinking, and ability to apply k and techniques. Correct use of data of resu tional skills.	nowledge to familiar and		
	С	evidence of some analytica Apply moderately effective	I and critical abilities and log lab skills and techniques.	edge required for attaining most of the course pical thinking, and ability to apply knowledge to Mostly correct but some erroneous use of d inizational and presentational skills.	o most familiar situations.		
	D						
	Fail						
Course Type	Lecture v	vith laboratory componen	nt course				
Course Teaching	Activitie	es .	Details		No. of Hours		
& Learning Activities	Lectures	}			24		
	Laborato	ory			20		
	Tutorials	, , , , , , , , , , , , , , , , , , ,			6		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination			70	CLO 1,2,3		
	Laboratory reports			30	CLO 1,2,3		
Required/recommended reading and contine materials	To be announced in class				·		
Course Website	http://mo	odle.hku.hk/					
Additional Course Information			t to a minimum enrollm	ent number and availability of teachers	S.		

BIOL4402	Micr	obial biotechnology (6 credits)	Academic	: <b>Year</b> 2017	
Offering Department	Biolo	gical Sciences	Quota	30	
Course Co-ordinator	, B	ological Sciences ()			
Teachers Involved	(,B	ological Sciences)			
Course Objectives	bioted the e	course is intended for students who would like to chology. The microbial systems being used include and of the course the students are expected to know ction and the systems available for the expression of	e different types of viruses, bacte v the parameters and conditions	ria, fungi and algae. As that affect the yield o	
Course Contents & Topics	micro algae limite	eam and downstream processing will be briefly de bial biotechnology. The latest advances in microbial will be reviewed. Specific examples on the use of d to production of recombinant vaccines, secondary iopesticides as well as bioremediation and medical d	expression systems using virus these systems will be provided metabolites, food and food addit	es, bacteria, yeasts an These include but no	
Course Learning Outcomes		1 explain the fundamental biochemical concepts ur biotechnology products		n of selected microbia	
	CLO 2 understand the importance of the current recombinant technology for large-scale manufacturing of various protein products				
	CLO 3 describe the major expression systems, understand their purposes, advantages, and disadvantages CLO 4 deliver a professional group presentation on a self-decided topic related to microbial biotechnology				
Pre-requisites (and Co-requisites and Impermissible combinations)		in BIOL3401	costact topic rotated to missions	Diction	
Offer in 2017 - 2018	N	Offer in 2018 - 2019 : N	Examinat	ion	
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of learning outcomes. Demonstrate deep understanding of theories, principles, evidence and techniques. Illustrate in a full range of high quality sources and to quote/reference	the subject. Demonstrate integration of sightful use and critical analysis / evaluat	the full range of appropriate ion of information drawn from	
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining most of the course learning outcomes. Demonstrate substantial grasp of the subject. Demonstrate general integration of theories, principles, evidence and techniques. Illustrate critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Apply effective organizational and presentational skills.				
	С				
	D	Demonstrate limited knowledge and skills required for atta- limited grasp, with retention of some relevant information,			

	Fail	and techniques. Demonstrate use and reference of several sources, but mainly through summary rather than analysis comparison. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no knowledge and skills required for attaining the course learning outcomes. Demonstrate evidence of or no grasp of the knowledge and understanding of the subject. Show little or no or inapt integration of theories, princi evidence and techniques. Show limited use of secondary sources and no critical comparison of them. Organization presentational skills are minimally effective or ineffective.				
Course Type	Lecture-ba	sed course				
Course Teaching	Activities	i	Details		No. of Hours	
& Learning Activities	Lectures				30	
	Tutorials		including group prese	including group presentations		
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		30	CLO 1,2,3,4	
	Examinati	on		70	CLO 1,2,3	
Required/recommended reading and online materials	Co., 1995)	A. N. Glazer and H. Nikaido: Microbial Biotechnology: Fundamentals of Applied Microbiology (W. H. Freeman &				
Course Website		ttp://moodle.hku.hk/				

OL4409	General v	virology (6 credits	s)	Academic Year	2017		
fering Department	Biological S		·	Quota	30		
ourse Co-ordinator		im, Biological Scienc	es (bllim@hku hk)	4			
achers Involved		, Diological colonic	(2)				
ourse Objectives	major viral	This Course provides the fundamental principles of virology so that students can understand the pathogenesis of major viral diseases that affect animal health. The course will prepare students for profession or graduate work in virology, medicine and biotechnology.					
ourse Contents Topics	· · · · · · · · · · · · · · · · · · ·						
ourse Learning utcomes	On success CLO 1 be CLO 2 gai	familiar with virus cla n hand-on experienc	s course, students should be able to: assification and the modes of replication and transes on common virological techniques	nsmission of variou	ıs viral families		
		•	virology after taking this course				
e-requisites nd Co-requisites d Impermissible mbinations)	Pass in BIC	DL3401 or BIOL3403					
fer in 2017 - 2018	N Offe	r in 2018 - 2019 : Y		Examination			
ade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of knowledge required for attaining all the course learning outcomes. Show strong analytical skills and competent ability to acquire knowledge on new development of the subject. Apply highly effective organizational and presentational skills.  Demonstrate unknowledge of the course of t						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical skills and adequate ability to acquire knowledge on new development of the subject. Apply effective lab skills and techniques. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical skills and certain ability to acquire knowledge on new development of the subject.  Apply moderate profited but limited command of knowledge and ekills, populated for otherwise learning outcomes.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of limited analytical skills and ability to acquire knowledge on new development of the subject. Apply partially effective lab skills and techniques. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack						
		of analytical skills and ab skills and techniques. Or	ility to acquire knowledge on new development of the subjection and presentational skills are minimally effective o	ct. Apply minimally effe			
ourse Type		h laboratory compon	ent course				
ourse Teaching	Activities		Details		No. of Hours		
Learning Activities	Lectures				24		
	Laboratory	,			24		
	Tutorials				6		

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examination		80	CLO 1,2,3			
	Laboratory reports		20	CLO 1,2,3			
Required/recommended reading and online materials	Virology: Molecular Biology and pa Principles of Virology (2009) S.J. F Basic Virology (2008) E.K. Wagner	Flint, ASM Press.	M Press.				
Course Website	http://moodle.hku.hk/						
Additional Course Information	,	Offer in alternate year from 2017-2018 This course will be offered subject to a minimum enrollment number and availability of teachers.					

BIOL4411	Plant ar	nd food biotechno	ology (6 credits)	Academic Y	ear 2017
Offering Department		Sciences		Quota	80
Course Co-ordinator			ences (jshtsang@hku.hk)		
Teachers Involved		Tsang, Biological Sci			
Course Objectives	increasing emerging other high plant and	g global food supply importance of plant n-value proteins will food biotechnology.	ciples and key concepts of plant r. The significances of biotechnol biotechnology in molecular farm the discussed. The course will also	logy in agriculture and food ing for the production of biop	production, and the charmaceuticals and
Course Contents & Topics	Transge - Tools in - Techniq - Nuclear - Gene sil Extendi Geneti anthocyal - Biotechr Producir Short-int Protectir Pest-res - Herbicid - Plants a biopharm Biodegra - Genetica - Status o	ues in plant gene trai and plastid transforn lencing in plants. Ge ng shelf-life of fruits. ically-engineered bin in tomatoes. nology in plant pest a ng crops resistant to terfering RNAs in gen g crops in the field ut istant genetically-trai le-resistant crops. as bioreactors for maceutical proteins. adable plastics. Biofu ally-modified crops ai of GM food in North A	od production. ering: promoters and marker gene nsfer: Agrobacterium-mediated trai nation. netic manipulation of commercially Prevention of enzymatic browning ofortified foods: provitamin A-ei nd disease management: phytopathogens and pests. ne silencing to defend against plan using the Bt toxin. nsformed seeds using the alpha-ar nolecular farming: transgenic and nels. nd food products: regulation, testin merica, Europe and Hong Kong.	nsformation, biolistics and mice was full biosynthetic pathways of potato tubers. In the process of process of the process of	in crops. hed soy and high
Course Learning			n of plant-derived pharmaceuticals nis course, students should be able		
Outcomes	CLO 1 ac bi CLO 2 ga	cquire key concept iotechnology ain insight into real-lit	s in plant and food biotechnologies in plant and food bio fe applications in plant and food bio firy and critical thinking skills	ogy and basic laboratory to	echniques in plant
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IOL3211 or BIOL340	1		
Offer in 2017 - 2018	Y 1st	sem Offer in 2018	- 2019 : Y	Examination	Dec
Grade Descriptors	A		and complete mastery of extensive knowle		
(A+ to F)	B C D	and ability to apply kno effective organizational Demonstrate substantia learning outcomes in papply knowledge to farm Demonstrate general loutcomes. Show evide familiar situations. Show Demonstrate partial bu Some evidence of coh apply knowledge in plar Fail to demonstrate cortical abilities, logical	unology. Show strong analytical and critical wledge to a wide range of complex, familia and presentational skills.  I command of a broad range of knowledge lant biotechnology. Show evidence of an illiar and some unfamiliar situations. Apply-but incomplete command of knowledge ance of some analytical and critical abilities w moderately effective organizational and pt ilmited command of knowledge and skills erent and logical thinking, accompanied w the biotechnology. Show limited or barely effimand of knowledge and skills required for and coherent thinking. No evidence in a	ar and unfamiliar situations in plant big ge and skills required for attaining at alytical and critical abilities and logic effective organizational and presenta and skills required for attaining most as and logical thinking, and ability to resentational skills. It required for attaining some of the court with limited analytical and critical skill cettive organizational and presentational attaining the course learning outcom	otechnology. Apply highly least most of the course all thinking, and ability to tional skills. It of the course learning apply knowledge to most ourse learning outcomes. Is. Show limited ability to nal skills. It is considered to the course learning outcomes. It is a skills. It is a lakells.
		organizational and pres	entational skills.		
Course Type	Lecture w	ith laboratory compo	nent course		
Course Teaching	Activitie	S	Details		No. of Hours
& Learning Activities	Lectures				
-	Laborato		practical/laboratory/project		24 30
		/ Self study	,		100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examina	tion		70	CLO 1,2,3
	Laborato	ry reports		10	CLO 1,2,3
	Presenta	tion		20	CLO 1,2,3
Required/recommended reading and online materials	Chrispeel E-reserve		ava. Plants, genes, and agriculture		- , ,-

Course Website	http://moodle.hku.hk/
Additional Course Information	Core in Molecular Biology & Biotechnology Major An advanced elective course in FNS Major An advanced elective course in Plant Science Minor

BIOL4415	Healtho	care biotechnology	(6 credits)	Academic Year	2017		
Offering Department	Biologica	al Sciences		Quota	70		
Course Co-ordinator	Prof A S	T Wong, Biological Scient	ences (awong1@hku.hk)				
Teachers Involved	,	Y Yuen,Biological Scien S T Wong,Biological Scien	•				
Course Objectives	This cou	<u> </u>	oncepts and principles involved i	n healthcare biotechnology, and	their application		
Course Contents & Topics	Genetic models i and orga Advance and deve medicine An overv target ide	Genetic biotechnology in animals (transgenics, knockouts and other related technologies): Transgenic animals as models in the study of human diseases, as bioreactors for the production of hormones, antibiotics and vaccines and organs for xenotransplantation.  Advanced molecular biology techniques related to human and animal science basic research, disease diagnosis and development of new therapies. These include but not limited to: applications of DNA technologies in diagnostic medicine and forensic science; tissue engineering.  An overview of the drug development process, with a focus on the early-stage, preclinical drug discovery, drug target identification, high-throughput assay development, and screening of chemical libraries (synthetic and natural products). The concept of individualized medicine will also be discussed.					
Course Learning		·	course, students should be able				
Outcomes							
Jucomes		•	genetic biotechnology and huma				
			ced laboratory techniques essen	0,	nrahlama in arda		
		o develop solutions	and critical thinking skills to und	lerstand, analyze, and evaluate	problems in orde		
			ld applications in healthcare biote	echnology			
Pre-requisites (and Co-requisites and Impermissible		CLO 4 gain insight into real-world applications in healthcare biotechnology  Pass in BIOL3401					
combinations)							
Offer in 2017 - 2018	Y 2n	nd sem Offer in 2018 -	2019 : Y	Examination	May		
Grade Descriptors	Α	Demonstrate thorough m	astery at an advanced level of extensi	ve knowledge required for attaining al			
			informed, thoughtful intellectual engagem	tuations. Apply highly effective organizations with broad range of relevant concep			
	B C	consistently demonstrate in Demonstrate substantial outcomes. Show evidence some unfamiliar situations engagement with broad rangement with broad rangement with broad rangement with proad rangement per some analytic Apply moderately effective theories but not always with Demonstrate partial but lie evidence of some cohere knowledge to solve profit	nformed, thoughtful intellectual engagem command of a broad range of knowledge e of analytical and critical abilities and k s. Apply effective organizational skills. N	nent with broad range of relevant concepter required for attaining at least most of ogical thinking, and ability to apply know Writings mostly demonstrate informed, witings mostly demonstrate informed, or attaining most of the course learng, and ability to apply knowledge to mindicate informed, intellectual engagements. For attaining some of the course learn analytical and critical abilities. Show lie organizational skills. Writings indicate informed in the course learn analytical and critical abilities.	ts.  of the course learnin, wledge to familiar an thoughtful intellectue rming outcomes. Shov ost familiar situations nent with concepts o ning outcomes. Shov imited ability to appl		
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•	C D Fail	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rand Demonstrate general but it evidence of some analytic Apply moderately effective theories but not always with Demonstrate partial but it evidence of some cohere knowledge to solve protengagement with conceptive Demonstrate little or not analytical and critical ability Organizational skills are nor theories. Writings are in with laboratory componers.	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and its. Apply effective organizational skills. Vince of relevant concepts. incomplete command of knowledge requipal and critical abilities and logical thinking organizational skills. Writings mostly this sufficient depth, breadth or understand imited command of knowledge required ent and logical thinking, but with limited olems. Apply limited or barely effectives or theories but mostly at a superficial le evidence of command of knowledge reties, logical and coherent thinking. Show ininimally effective or ineffective. Writings relevant or superficial.	nent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, it of attaining most of the course learing, and ability to apply knowledge to mindicate informed, intellectual engager ling.  for attaining some of the course learn analytical and critical abilities. Show life or or attaining some of the course learn analytical and critical abilities. Show life or or attaining the course learn well.	ts.  of the course learning whedge to familiar and thoughtful intellectual ming outcomes. Show ost familiar situations nent with concepts o ning outcomes. Show imited ability to apply ate some intellectual g outcomes. Lack o tige to solve problems gement with concept		
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Course Teaching	C D Fail Lecture v Activitie Lectures	consistently demonstrate in Demonstrate substantial outcomes. Show evidence some unfamiliar situations engagement with broad rate of Demonstrate general but evidence of some analytic Apply moderately effective theories but not always with Demonstrate partial but in evidence of some cohere knowledge to solve profundational situation or analytical and critical ability Organizational skills are nor theories. Writings are in with laboratory componenses.	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and its. Apply effective organizational skills. Vince of relevant concepts. incomplete command of knowledge requipal and critical abilities and logical thinking organizational skills. Writings mostly this sufficient depth, breadth or understand imited command of knowledge required ent and logical thinking, but with limited olems. Apply limited or barely effectives or theories but mostly at a superficial le evidence of command of knowledge reties, logical and coherent thinking. Show ininimally effective or ineffective. Writings relevant or superficial.	nent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, it of attaining most of the course learing, and ability to apply knowledge to mindicate informed, intellectual engager ling.  for attaining some of the course learn analytical and critical abilities. Show life or or attaining some of the course learn analytical and critical abilities. Show life or or attaining the course learn well.	ts.  of the course learning whedge to familiar and thoughtful intellectual rining outcomes. Show ost familiar situations nent with concepts on hing outcomes. Show imited ability to apply at a some intellectual goutcomes. Lack of ge to solve problems gement with concept.  No. of Hours 24		
Course Teaching	C D Fail Lecture v Activitie Lectures Laborate	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rand Demonstrate general but it evidence of some analytic Apply moderately effective theories but not always will be promonstrate partial but it evidence of some cohere knowledge to solve profunded to solve p	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and its. Apply effective organizational skills. Vince of relevant concepts. incomplete command of knowledge requipal and critical abilities and logical thinking organizational skills. Writings mostly this sufficient depth, breadth or understand imited command of knowledge required ent and logical thinking, but with limited olems. Apply limited or barely effectives or theories but mostly at a superficial le evidence of command of knowledge reties, logical and coherent thinking. Show ininimally effective or ineffective. Writings relevant or superficial.	nent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, it of attaining most of the course learing, and ability to apply knowledge to mindicate informed, intellectual engager ling.  for attaining some of the course learn analytical and critical abilities. Show life or or attaining some of the course learn analytical and critical abilities. Show life or or attaining the course learn well.	ts.  of the course learning whedge to familiar and thoughtful intellectual rining outcomes. Show ost familiar situations nent with concepts on hing outcomes. Show imited ability to apply at a some intellectual goutcomes. Lack of the solve problems gement with concept.  No. of Hours  24  24		
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Course Teaching	C D Fail Lecture v Activitie Lectures Laboratt Tutorials	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rand Demonstrate general but it evidence of some analytic Apply moderately effective theories but not always will be promonstrate partial but it evidence of some cohere knowledge to solve profunded to solve p	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and less. Apply effective organizational skills. Varience of relevant concepts. Incomplete command of knowledge required and critical abilities and logical thinking organizational skills. Writings mostly this sufficient depth, breadth or understand imited command of knowledge required ent and logical thinking, but with limited olems. Apply limited or barely effective sor theories but mostly at a superficial le evidence of command of knowledge reties, logical and coherent thinking. Show innimimally effective or ineffective. Writings relevant or superficial.	ent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, irred for attaining most of the course learing, and ability to apply knowledge to mindicate informed, intellectual engagement of the course learn analytical and critical abilities. Show like organizational skills. Writings indicated.  Equired for attaining the course learning very little or no ability to apply knowled a reveal an absence of intellectual engagement.	ts.  of the course learnin, whedge to familiar an thoughtful intellectuaring outcomes. Show ost familiar situations nent with concepts on the course of the		
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Course Teaching Learning Activities Assessment Methods	C D Fail Lecture v Activitie Lectures Laborate Tutorials Reading	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rare Demonstrate general but evidence of some analytic Apply moderately effective theories but not always with Demonstrate partial but in evidence of some cohere knowledge to solve protengagement with conception or analytical and critical ability Organizational skills are nor theories. Writings are in with laboratory components.	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and logs. Apply effective organizational skills. Varience of relevant concepts. Incomplete command of knowledge required and critical abilities and logical thinking organizational skills. Writings mostly this sufficient depth, breadth or understance and logical thinking, but with limited others. Apply limited or barely effective or theories but mostly at a superficial lefevidence of command of knowledge reties, logical and coherent thinking. Show minimally effective or ineffective. Writings relevant or superficial.	nent with broad range of relevant concepter required for attaining at least most or opical thinking, and ability to apply know Writings mostly demonstrate informed, sired for attaining most of the course learning, and ability to apply knowledge to mindicate informed, intellectual engagent ling.  for attaining some of the course learning analytical and critical abilities. Show life or or attaining some of the course learning analytical and critical abilities. Show life or or attaining the course learning were learning to enganizational skills. Writings indicated in the course learning were learning to apply knowleds or reveal an absence of intellectual engagers.  Weighting in final course grade (%)	ts.  of the course learning whedge to familiar and thoughtful intellectual ming outcomes. Show ost familiar situations nent with concepts of the control of the course of		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	C D Fail Lecture v Activitie Lectures Laborate Tutorials Reading Method	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rate of some analytic Apply moderately effective theories but not always with Demonstrate partial but in evidence of some coherent knowledge to solve protengagement with conception Demonstrate little or not analytical and critical ability Organizational skills are nor theories. Writings are in with laboratory components.	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and less. Apply effective organizational skills. In incomplete command of knowledge request and critical abilities and logical thinking organizational skills. Writings mostly the sufficient depth, breadth or understance imited command of knowledge required ent and logical thinking, but with limited olems. Apply limited or barely effectives or theories but mostly at a superficial le evidence of command of knowledge reties, logical and coherent thinking. Show ininimally effective or ineffective. Writings relevant or superficial.	nent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, sired for attaining most of the course learning, and ability to apply knowledge to mindicate informed, intellectual engagem ling.  for attaining some of the course learning analytical and critical abilities. Show life or opical and critical abilities. Show life or attaining the course learning well and critical abilities indicated in the course learning well are or attaining the course learning well are reveal an absence of intellectual engagements.  Weighting in final course grade (%)	ts.  of the course learning whedge to familiar and thoughtful intellectual raining outcomes. Show ost familiar situations nent with concepts of the course o		
Course Teaching Learning Activities Assessment Methods	C D Fail Lecture v Activitie Lectures Laborate Tutorials Reading Method	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rate of some analytic Apply moderately effective theories but not always with Demonstrate partial but in evidence of some coherent knowledge to solve protengagement with conception Demonstrate little or not analytical and critical ability Organizational skills are nor theories. Writings are in with laboratory components.	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and less. Apply effective organizational skills. In incomplete command of knowledge request and critical abilities and logical thinking organizational skills. Writings mostly the sufficient depth, breadth or understance imited command of knowledge required ent and logical thinking, but with limited olems. Apply limited or barely effectives or theories but mostly at a superficial le evidence of command of knowledge reties, logical and coherent thinking. Show ininimally effective or ineffective. Writings relevant or superficial.	nent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, wired for attaining most of the course learing, and ability to apply knowledge to mindicate informed, intellectual engagem ling.  If a staining some of the course learn analytical and critical abilities. Show life of a staining in a critical abilities of a companizational skills. Writings indicated in the course learn analytical and critical abilities of the course learn and the course learn in the course learn and the course learn in the course learn and the course learn in	ts.  of the course learning whedge to familiar anthoughtful intellectual rating outcomes. Show ost familiar situations nent with concepts on the course of t		
Course Teaching & Learning Activities Assessment Methods	C D Fail Lecture v Activitie Lectures Laborate Tutorials Reading Method	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rare Demonstrate general but evidence of some analytic Apply moderately effective theories but not always with Demonstrate partial but in evidence of some coherer knowledge to solve protengagement with conceptive Demonstrate little or not analytical and critical ability Organizational skills are nor theories. Writings are in with laboratory componency.  Soly Self study  Senents  enents  attion	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and less. Apply effective organizational skills. In incomplete command of knowledge request and critical abilities and logical thinking organizational skills. Writings mostly the sufficient depth, breadth or understance imited command of knowledge required ent and logical thinking, but with limited olems. Apply limited or barely effectives or theories but mostly at a superficial le evidence of command of knowledge reties, logical and coherent thinking. Show ininimally effective or ineffective. Writings relevant or superficial.	rent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, wired for attaining most of the course learing, and ability to apply knowledge to mindicate informed, intellectual engagem ling.  for attaining some of the course learn analytical and critical abilities. Show lie e organizational skills. Writings indicated well.  Equired for attaining the course learn analytical and critical abilities are vell as reveal an absence of intellectual engagement of the course learn analytical for attaining the course learn analytical for attaining the course learn analytical and critical abilities. Show lie are vell for attaining the course learn analytical and critical abilities. Show lie are vell for attaining the course learn analytical and critical abilities. Show lie are vell for attaining the course learn analytical and critical abilities. Show lie are vell for attaining the course learn analytical and critical abilities. Show lie are vell for attaining the course learn analytical and critical abilities. Show lie are organizational skills. Writings indicate the course learn analytical and critical abilities. Show lie are organizational skills. Writings indicate analytical and critical abilities. Show lie are organizational skills. Writings indicate analytical and critical abilities. Show lie are organizational skills. Writings indicate analytical and critical abilities. Show lie are organizational skills. Writings indicate analytical and critical abilities. Show lie are organizational skills. Writings indicate analytical and critical abilities.	ts.  of the course learnin whedge to familiar an thoughtful intellectuar ming outcomes. Show ost familiar situations and the with concepts of the course of		
Course Teaching Learning Activities Assessment Methods and Weighting Required/recommended	C D Fail Lecture of Activities Lectures Laborate Tutorials Reading Methods Assignm Examina Laborate Test - Textbooler Human	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rare Demonstrate general but evidence of some analytic Apply moderately effective theories but not always with Demonstrate partial but in Demonstrate partial but it evidence of some cohere knowledge to solve protengagement with concept. Demonstrate little or notengalizational skills are notent to the process. Writings are in with laboratory components. Writings are in the protent substantial stills are substantial to the protent substantial stills are in the protent substantial substantial stills are in the protent substantial substanti	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and logs. Apply effective organizational skills. Variety of relevant concepts. Incomplete command of knowledge required and critical abilities and logical thinking organizational skills. Writings mostly this sufficient depth, breadth or understance and logical thinking, but with limited olems. Apply limited or barely effective or theories but mostly at a superficial leveridence of command of knowledge required evidence of command of knowledge reties, logical and coherent thinking. Showninimally effective or ineffective. Writings relevant or superficial.  Introduce Details  Details  Assignment/Discussion  Discovery (Krogsgaard-Larsen, Lirachan and Read, Garland Scien	lent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, wired for attaining most of the course learing, and ability to apply knowledge to mindicate informed, intellectual engagement of the course learn analytical and critical abilities. Show like organizational skills. Writings indicated for attaining the course learn analytical and critical abilities. Show like organizational skills. Writings indicated for attaining the course learning very little or no ability to apply knowled a reveal an absence of intellectual engagement of the course grade (%)  Weighting in final course grade (%)  10 60 20 10 lijefors, and Madsen, Taylor & Frighting for the provided for the course grade (%)	ts. of the course learnin- whedge to familiar an thoughtful intellectual rning outcomes. Show ost familiar situations nent with concepts of hing outcomes. Show imited ability to appliate some intellectual groutcomes. Lack of tige to solve problems gement with concept  No. of Hours  24  24  6  100  Assessment Methods to CLO Mapping CLO 1,3,4 CLO 1,3,4 CLO 1,2,3,4 CLO 1,3,4		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and conline materials	C D Fail  Lecture of Activities Lectures Laborate Tutorials Reading Methods  Assignm Examinat Laborate Test - Textboo - Human - Sugges	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rare Demonstrate general but in evidence of some analytic Apply moderately effective theories but not always with Demonstrate partial but it evidence of some coherer knowledge to solve protengagement with concepts. Demonstrate little or no analytical and critical ability Organizational skills are nor theories. Writings are in with laboratory components.  Solve Self Study  Solve Self study  Solve of Drug Design and Elements  Molecular Genetics (Stieted readings for each to	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and logs. Apply effective organizational skills. Variety of relevant concepts. Incomplete command of knowledge required and critical abilities and logical thinking organizational skills. Writings mostly this sufficient depth, breadth or understance and logical thinking, but with limited olems. Apply limited or barely effective or theories but mostly at a superficial leveridence of command of knowledge required evidence of command of knowledge reties, logical and coherent thinking. Showninimally effective or ineffective. Writings relevant or superficial.  Introduce Details  Details  Assignment/Discussion  Discovery (Krogsgaard-Larsen, Lirachan and Read, Garland Scien	lent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, wired for attaining most of the course learing, and ability to apply knowledge to mindicate informed, intellectual engagement of the course learn analytical and critical abilities. Show like organizational skills. Writings indicated for attaining the course learn analytical and critical abilities. Show like organizational skills. Writings indicated for attaining the course learning very little or no ability to apply knowled a reveal an absence of intellectual engagement of the course grade (%)  Weighting in final course grade (%)  10 60 20 10 lijefors, and Madsen, Taylor & Frighting for the provided for the course grade (%)	ts. of the course learning whedge to familiar anthoughtful intellectual rating outcomes. Show ost familiar situations nent with concepts of the course of th		
Course Teaching Learning Activities Assessment Methods and Weighting Required/recommended	C D Fail  Lecture of Activities Lectures Laborate Tutorials Reading Methods  Assignm Examinat Laborate Test - Textboo - Human - Sugges	consistently demonstrate in Demonstrate substantial of outcomes. Show evidence some unfamiliar situations engagement with broad rare Demonstrate general but evidence of some analytic Apply moderately effective theories but not always with Demonstrate partial but in Demonstrate partial but it evidence of some cohere knowledge to solve protengagement with concept. Demonstrate little or notengalizational skills are notent to the process. Writings are in with laboratory components. Writings are in the protent substantial stills are substantial to the protent substantial stills are in the protent substantial substantial stills are in the protent substantial substanti	informed, thoughtful intellectual engagem command of a broad range of knowledge of analytical and critical abilities and logs. Apply effective organizational skills. Variety of relevant concepts. Incomplete command of knowledge required and critical abilities and logical thinking organizational skills. Writings mostly this sufficient depth, breadth or understance and logical thinking, but with limited olems. Apply limited or barely effective or theories but mostly at a superficial leveridence of command of knowledge required evidence of command of knowledge reties, logical and coherent thinking. Showninimally effective or ineffective. Writings relevant or superficial.  Introduce Details  Details  Assignment/Discussion  Discovery (Krogsgaard-Larsen, Lirachan and Read, Garland Scien	lent with broad range of relevant concepter required for attaining at least most of opical thinking, and ability to apply know Writings mostly demonstrate informed, wired for attaining most of the course learing, and ability to apply knowledge to mindicate informed, intellectual engagement of the course learn analytical and critical abilities. Show like organizational skills. Writings indicated for attaining the course learn analytical and critical abilities. Show like organizational skills. Writings indicated for attaining the course learning very little or no ability to apply knowled a reveal an absence of intellectual engagement of the course grade (%)  Weighting in final course grade (%)  10 60 20 10 lijefors, and Madsen, Taylor & Frighting for the provided for the course grade (%)	ts. of the course learnin whedge to familiar an thoughtful intellectuar ming outcomes. Show ost familiar situations nent with concepts of ming outcomes. Show imited ability to applate some intellectuar goutcomes. Lack of the color of the c		

BIOL4416	Stem cells and regenerative biology (6 credits)	Academic Year	2017		
Offering Department	Biological Sciences	Quota	40		
Course Co-ordinator	Dr K W Y Yuen, Biological Sciences (kwyyuen@hku.hk)				
Teachers Involved	(Dr J Zhang,Biological Sciences) (Dr K W Y Yuen,Biological Sciences)				
Course Objectives	To introduce the current understanding in regenerative biology, aging and longevity at the cellular and molecular level, and to present the interconnection between these biological events.				
Course Contents & Topics	The course will discuss cutting-edge research in (i) regenerative and stem cell biology: - the basic characteristics of stem cells				

	,	nic and adult stem	cells ripotent stem cells and tissue engineer	ina		
			stem cell technology	ing		
	- ethical issues in stem cell research					
		and longevity:				
			ging and life-span studies			
		and molecular biol	0, 0			
		es and cellular sen c stability, DNA mu				
		ndrial defects and				
		aging diseases				
	- genetic	,biochemical and r	netabolic pathways involved in longevit	ty		
Course Learning		•	f this course, students should be able t			
Outcomes			nplex regulations of cell potency, cell a	0 0 1		
			acteristics of stem cells and the differen	J.		
	CLO 3 describe applications of stem cell research, and understand ethical concerns involved in longovity.				đ	
Duo vomiliaitos	CLO 4 describe the cellular mechanisms of aging, and the pathways involved in longevity  Pass in BIOC3601 or BIOC3604 or BIOL3211 or BIOL3401 or BIOL3402 or BIOL3403 or BIOL3404 or				2404 or DIOL 2400	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass III D	SIOCSOUT OF BIOC.	3004 OF BIOL3211 OF BIOL3401 OF BIO	PL3402 OF BIOL3403 OF BIOL	-3404 OF BIOL3406	
Offer in 2017 - 2018	N Offer in 2018 - 2019 : Y		: Y	Examination		
Grade Descriptors (A+ to F)	A	course learning out	gh and complete mastery at an advanced level of comes. Show strong analytical and critical abilitie eledge to a wide range of complex, familiar and u	es and logical thinking, with evidence	ce of original thought, and	
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cours learning outcomes. Evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar an some unfamiliar situations. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
			coherent and logical thinking, but with limited a	analytical and critical abilities. Sho		
	Fail	knowledge to solve properties to solve properties of analytical and creating the solution of analytical analytical and creating the solution of analytical analytic	coherent and logical thinking, but with limited a	analytical and critical abilities. Sho izational and presentational skills. ills required for attaining the course Show very little or no ability to ap	w limited ability to apply e learning outcomes. Lack	
Course Type		knowledge to solve properties to solve properties of analytical and creating the solution of analytical analytical and creating the solution of analytical analytic	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ: no evidence of command of knowledge and ski titical abilities, logical and coherent thinking. tion and presentational skills are minimally effect	analytical and critical abilities. Sho izational and presentational skills. ills required for attaining the course Show very little or no ability to ap	w limited ability to apply e learning outcomes. Lack	
		knowledge to solve Demonstrate little or of analytical and cr problems. Organizat with laboratory com	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ: no evidence of command of knowledge and ski titical abilities, logical and coherent thinking. tion and presentational skills are minimally effect	analytical and critical abilities. Sho izational and presentational skills. ills required for attaining the course Show very little or no ability to ap	w limited ability to apply e learning outcomes. Lack	
Course Teaching	Lecture w	knowledge to solve Demonstrate little or of analytical and cr problems. Organizat with laboratory com	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ no evidence of command of knowledge and ski titical abilities, logical and coherent thinking. tion and presentational skills are minimally effect ponent course	analytical and critical abilities. Sho izational and presentational skills. ills required for attaining the course Show very little or no ability to ap	we limited ability to apply e learning outcomes. Lack pply knowledge to solve	
Course Teaching	Lecture w Activitie Lectures Laborato	knowledge to solve Demonstrate little or of analytical and or problems. Organizat vith laboratory com	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ no evidence of command of knowledge and ski titical abilities, logical and coherent thinking. tion and presentational skills are minimally effect ponent course	analytical and critical abilities. Sho izational and presentational skills. ills required for attaining the course Show very little or no ability to ap	we limited ability to apply the learning outcomes. Lack poply knowledge to solve  No. of Hours  24  24	
Course Teaching	Lecture w Activitie Lectures Laborato Tutorials	knowledge to solve Demonstrate little or of analytical and or problems. Organizat vith laboratory com s	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ no evidence of command of knowledge and ski titical abilities, logical and coherent thinking. tion and presentational skills are minimally effect ponent course	analytical and critical abilities. Sho izational and presentational skills. ills required for attaining the course Show very little or no ability to ap	No. of Hours  24  24  6	
Course Teaching & Learning Activities	Lecture w Activitie Lectures Laborato Tutorials Reading	knowledge to solve Demonstrate little or of analytical and or problems. Organizat with laboratory com s  ry / Self study	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ on evidence of command of knowledge and skitical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details	analytical and critical abilities. Sho izational and presentational skills. ills required for attaining the course show very little or no ability to a live or ineffective.	No. of Hours  24  24  6  100	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials	knowledge to solve Demonstrate little or of analytical and or problems. Organizat with laboratory com s  ry / Self study	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ no evidence of command of knowledge and ski titical abilities, logical and coherent thinking. tion and presentational skills are minimally effect ponent course	analytical and critical abilities. Sho izational and presentational skills. ills required for attaining the course Show very little or no ability to ap	No. of Hours  24  24  6	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods	knowledge to solve   Demonstrate little or of analytical and or problems. Organizat with laboratory com   Sory   / Self study   sents	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ on evidence of command of knowledge and skitical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details	analytical and critical abilities. Sho izational and presentational skills. Illis required for attaining the course show very little or no ability to appreciate or ineffective.  Weighting in final course grade (%)	No. of Hours  24  24  6  100  Assessment Methods to CLO Mapping CLO 1,2,3,4	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignme Examina	knowledge to solve   Demonstrate little or of analytical and or problems. Organizat with laboratory comiss  ory  / Self study  ents tion	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ ro evidence of command of knowledge and skirtical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details	analytical and critical abilities. Sho izational and presentational skills. Illis required for attaining the course show very little or no ability to a five or ineffective.  Weighting in final course grade (%)  10 60	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignme Examina Laborato	knowledge to solve   Demonstrate little or of analytical and or problems. Organizat with laboratory com   Sory   / Self study   sents	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ ro evidence of command of knowledge and skirtical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details	analytical and critical abilities. Sho izational and presentational skills. Illis required for attaining the course show very little or no ability to a rive or ineffective.  Weighting in final course grade (%)  10 60 20	No. of Hours  24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods and Weighting	Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignme Examina Laborato Test	knowledge to solve   Demonstrate little or of analytical and or problems. Organizat with laboratory comes  ory / Self study sents tition ory reports	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ ro evidence of command of knowledge and skirtical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details	analytical and critical abilities. Sho izational and presentational skills. Illis required for attaining the course show very little or no ability to a five or ineffective.  Weighting in final course grade (%)  10 60	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignm Examina Laborato Test Reference	knowledge to solve   Demonstrate little or of analytical and or problems. Organizat with laboratory comes  ory / Self study sents tition ory reports	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ ro evidence of command of knowledge and skirtical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details   Details	analytical and critical abilities. Sho izational and presentational skills. Illis required for attaining the course show very little or no ability to a rive or ineffective.  Weighting in final course grade (%)  10 60 20	No. of Hours  24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignme Examina Laborato Test Reference Essentiale edited by Science in By Andre	knowledge to solve   Demonstrate little or of analytical and or problems. Organizat with laboratory comes.  // Self study  sents stion bry reports  es: s of stem cell biolor Robert Paul Lanzat n medicine: the JC www. Marks, American and analytical normal structure.	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ in one vidence of command of knowledge and skirtical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details	analytical and critical abilities. Sho izational and presentational skills. Illis required for attaining the course show very little or no ability to appreciate the course of the course grade (%).  Weighting in final course grade (%)  10 60 20 10	No. of Hours  24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignm Examina Laborato Test Reference Essential edited by Science in By Andre	knowledge to solve   Demonstrate little or of analytical and or problems. Organizat with laboratory comes.  / Self study  sents tition or reports  es: s of stem cell biolo Robert Paul Lanzan medicine: the JC w R. Marks, Amerir biology of aging,	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ ro evidence of command of knowledge and skirtical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details	analytical and critical abilities. Sho izational and presentational skills.  iills required for attaining the course show very little or no ability to appreciate the course of the course grade (%)  Weighting in final course grade (%)  10 60 20 10  Jshma S. Neill	No. of Hours  24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignme Examina Laborato Test Reference Essential edited by Science is By Andre Molecular By Leona	knowledge to solve   Demonstrate little or of analytical and or problems. Organizat with laboratory comes.  / Self study  sents cition or reports  es: s of stem cell biolo Robert Paul Lanzan medicine: the JC w R. Marks, Ameri r biology of aging, and Guarente, Linda	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ in one vidence of command of knowledge and skirtical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details	analytical and critical abilities. Sho izational and presentational skills.  iills required for attaining the course show very little or no ability to appreciate the course of the course grade (%)  Weighting in final course grade (%)  10 60 20 10  Jshma S. Neill	No. of Hours  24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignme Examina Laborato Test Reference Essentiale edited by Science in By Andre Molecular By Leona http://moo	knowledge to solve   Demonstrate little or of analytical and or problems. Organizat with laboratory comes.  / Self study  sents tition or reports  es: s of stem cell biolo Robert Paul Lanzan medicine: the JC w R. Marks, Amerir biology of aging,	coherent and logical thinking, but with limited a problems. Apply limited or barely effective organ in o evidence of command of knowledge and skitical abilities, logical and coherent thinking. Stion and presentational skills are minimally effect ponent course    Details	analytical and critical abilities. Sho izational and presentational skills.  iills required for attaining the course show very little or no ability to appreciate the course of the course grade (%)  Weighting in final course grade (%)  10 60 20 10  Jshma S. Neill	No. of Hours  No. of Hours  24  24  6  100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	

BIOL4417	'Omics' and systems biology (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	40
Course Co-ordinator	Dr J W Zhang, Biological Sciences (jzhang1@hku.hk)		
Teachers Involved	(Dr J W Zhang, Biological Sciences)		
Course Objectives	Recent progress in high-throughput omics technology has revolutionized the laprofiling of various biomolecules simultaneously by omics technology generates the potential to obtain a global and holistic view of the system. This course ain Omics and Systems Biology, and overview of various applications of omics technicon technicon progression of the state-of-the-and know-how available to those working on an omics projects as well as those progressions.	s huge amounts on to introduce the innology in agricular the knowledge of	of data, providing e technologies of tural, biomedical, Systems Biology
Course Contents & Topics	The course covers various OMICS techniques with special focus on sequiple sequencing, computational modeling, and statistic programming. This course we experience in large scale data analysis, and high-throughput methodologies invoidenomics - the study of all genes or DNA sequences in a genome Transcriptomics - the study of all mRNA transcripts  Proteomics - the study of all proteins  Interactomes - the study of all genetic or physical interactions among genes or processes and functional genomics - the study of the interactome/ne	rill also provide si lved in: roteins	udents hands-on

		ll system, and modeling to omics - all genetic materi		ed function and emergent properties	of that system	
		mics - metabolites & inte				
Course Learning		essful completion of this of		0		
Outcomes		explain the conceptual disproach, and discuss the		Omics'/Systems Biology studies and h approaches	traditional one-gene	
	CLO 2 d	lescribe common method	ologies used in major	'Omics' studies		
	CLO 3 d	lescribe basic analytical n	nethods, and access o	database resources generated in ma	jor 'Omics' studies	
		lescribe how 'Omics' dat system	a are used in Syster	ns Biology to understand the integ	rated functions of the	
		dentify questions that car applications in 'Omics' stu		nics' and System Biology studies, aរុ	opreciate and describe	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ss in BIOC3601 or BIOC3604 or BIOL3211 or BIOL3401 or BIOL3402 or BIOL3403 or BIOL3404 or BIOL340				
Offer in 2017 - 2018	Y 2n	id sem Offer in 2018 - 2	019 : N	Examination	on May	
Grade Descriptors (A+ to F)	Α					
	В					
	С					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture v	with laboratory componen	t course	<u> </u>		
Course Teaching	Activitie	es .	Details		No. of Hours	
& Learning Activities	Lectures	1			24	
	Laborato	ory			24	
	Reading / Self study				100	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)		
	Assignm	nents		40	CLO 2,3,4,5	
	Examina	ation		60	CLO 1,2,3,4,5	
Required/recommended reading and online materials	ТВА					
Course Website	http://mo	odle.hku.hk/				
Additional Course Information	Offer in a	alternate year from 2017-2		nent number and availability of teach	ers.2018	

BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6 credits)	Academic Year	2017				
Offering Department	Biological Sciences	Quota	12				
Course Co-ordinator	Dr L Karczmarski, Biological Sciences (leszek@hku.hk)						
Teachers Involved							
Course Objectives	This course offers an exciting experiential learning opportunity through hall behavioural ecology and conservation of free-ranging cetaceans (whales students with a fundamental knowledge, skills, and the appreciation of weffectively run field studies in cetacean ecology, behaviour and conservation mobile marine vertebrates.	, dolphins and porpo hat it takes to design	ises). It provides , implement, and				
Course Contents & Topics	Field-based studies of cetaceans have been rapidly evolving in recent developments that allow researchers to tackle previously unexplored aver component of cetacean studies, the direct contact with free-ranging animals and on their terms remains unchanged; both challenging and fascinatin research site outside Hong Kong, will expose students to various aspect definition of a research question to project design, and to various stages of will learn a suite of research techniques, and will exercise their skills in cemphasis will be on delphinid behavioural ecology and conservation applice the scientific reasoning and methodology, and will develop an understanding to advancing science and benefiting broader conservation management informal discussions of current research and recent discoveries, review of extensive field component with sea-based research surveys performed difield-based activities, students are required to write an independent report course.	ues of research. How sout at sea, in their nang. This course, concepts of cetacean field so data collection and all lata processing and in reations; students will be go how individual projections. The course in innovative research aily (weather permitting)	ever, the primary tural environment ducted in a field studies, from the nalyses. Students terpretation. The e guided through cts can contribute nocludes lectures, techniques, and g). Following the				
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 understand of the biodiversity and primary habitats in the ecosystem studied						
	CLO 2 establish the basic skills needed to identify target species associated with the field course						
	CLO 3 be knowledgeable about and able to implement sampling techniques for organisms in the particular ecosystems studied						
	CLO 4 understand the basic ecology of target species and how biotic and a	•	cal communities				
Pre-requisites	Pass in at least one of the following courses: BIOL3101, BIOL3301, BIOL33	13 or BIOL3320.					
(and Co-requisites	This experiential field course is primarily for Ecology & Biodiversity Major st						

and Impermissible combinations)			owed to take this experiential cours se is best suited for year 3 students.	se is their year 3 study	; and because it is
Offer in 2017 - 2018	N Of	ffer in 2018 - 2019 : N		Examination	
Grade Descriptors (A+ to F)	A	Evidence of a thorough grasp of the subject and relevant research techniques. Eagerness and enthusiasm to learn and excellent familiarity with relevant background reading and case studies. Exemplary handling of field data collection and excellent analytical skills. Ample evidence of independent critical thought with excellent use of a broad range of fundamental concepts and broader comparative perspective to draw insightful and logical conclusions. Show outstanding abilities of independent work, effective presentation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree level.			
	В	Evidence of a good grasp of the subject and relevant research techniques. Interest in learning and good-to-moderate familiarity with relevant background reading and case studies. Good handling of field data collection and commendable analytical skills. Good evidence of critical thought (although not always independent), with an appreciable use of fundamental concepts and consideration of broader comparative perspective in drawing logical conclusions. Good abilities of independent work, effective presentation skills with logical and analytical argumentation. Work more than sufficient for what is required at degree level.			
	С	relevant background reading critical thinking (although no	but incomplete grasp of the subject and re g and case studies, but no interest in learning ot always independent), with mostly good use h mostly correct argumentation, but limited d for degree level.	beyond the adequate average of fundamental concepts to concepts to concepts to concepts.	level. Evidence of logical draw logical conclusions.
	D	research techniques. Some abilities of critical independe	of the subject, but only partial and with limit familiarity with relevant case studies, but in ent thinking. Ineffective presentation skills wit e conclusions. Work barely meets what is requ	sufficient evidence of backgro h generally weak logical argui	und reading and limited
	Fail	background reading and no	ninimum grasp of the subject and the mini of familiarity with any relevant examples and of ation skills with poor argumentation and no	case studies. Inadequate evid	ence of coherent logical
Course Type	Field can	nps			
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures	3	lectures and tutorials		12
	Field work				80
	Presentation		interactive debates		10
	Reading	/ Self study			100
	Assessn	nent	group projects		12
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	nents		35	CLO 1,2,3,4
	Report		project report (35%), group investigation & presenation (30%)	65	CLO 1,2,3,4
Required/recommended reading and online materials	whales. Boyd, I.L	Chicago University Press	, S.J. (eds). 2010. Marine Mammal		•
Course Website	http://ww	w.biosch.hku.hk/ecology/	'lsc/		
Additional Course	Enrollme	nt Procedure:			
Information	submit a not later 1. Person 2. ID pho 3. Brief d 4. GPA 5. Pre-re	brief (maximum 1-page) than 10th January. The a nal and academic details otograph lescription of academic in quisite courses taken and	d grades received (if pre-requisites ar	to the Course Coordina e not met, a reasoned re	tor (leszek@hku.hk equest for waiver)
			orior to the commencement of the 2 period of the 2nd semester.	nd semester and results	s will be announced

BIOL4501	Molecular phylogenetics and evolution (6 credits)	Academic Year	2017				
Offering Department	Biological Sciences	Quota	25				
Course Co-ordinator	TBC, Biological Sciences ()						
Teachers Involved	(TBC,Biological Sciences)						
Course Objectives	The purpose of this course is to provide a comprehensive overview of state phylogenetic research, focusing on in depth coverage of the latest technique in formal lectures is coupled with practical workshops.  - acquisition of the sequences from the databases  - DNA and protein sequence assembly and alignment  - phylogeny reconstruction using parsimony, distance based, and maximum I  - introduction to relevant software for phylogenetics  - methods for the evaluation of phylogene trees	s. The treatment of	theoretical issues				
Course Contents & Topics	Introduction to molecular systematics and phylogenetics. Tree of life. Obtain and tissue samples for use in molecular studies. Sources of molecular dat studies, taxon sampling and marker choice. Overview of basic laboratory isolation, PCR, DNA sequencing). Sequence editing and aligning; utilizing pto for nucleotide polymorphism and diversity. Methods for phylogeny reconstruction maximum likelihood, Bayesian methods. Statistical methods for the evaluation phylogeny reconstruction. Molecular markers in conservation and ecological organisms. Biogeography vs. phylogeography using molecular data.	a, experimental des methods for data ablic sequence datal ction: parsimony, den of phylogenetic tr	ign for molecular collection (DNA pases. Estimation stance methods, ees. Software for				
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 understand the fundamental principles of molecular phylogenetics						
	CLO 2 understand the purposes each method is used for and be able to choose the most appropriate method(s) for the analysis of given data						
	CLO 3 understand the advantages and disadvantages of the methods						
	CLO 4 acquire practical skills for the analysis of molecular data						
Pre-requisites (and Co-requisites	Pass in BIOL3401 or BIOL3408						

combinations)					
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N		Examination	)
Grade Descriptors (A+ to F)	Α	learning outcomes of the apply the relevant theories methods and software for	course. Show deep understanding s, principles, and methods taught r evolutionary analysis of real da	level of skills sufficient for achieving all g of the course subject. Excellent ability in in the course. Advanced skills in possess ita. Excellent ability to collect, systematis priately. Excellent presentational skills.	to efficiently combine and ion and application of the
	B Demonstrate good knowledge and good level of skills sufficient for accomplishing most of the goals and expected learning outcomes of the course. Demonstrate good understanding of the course subject. Show good ability to combine and to apply theories, principles, and methods taught in the course. Substantial skills in possession and application of the methods and software for molecular evolutionary analysis of real data. Show good ability to collect, systematize, analyze and critically evaluate data from various sources and to quote them appropriately. Good presentational skills.				
	С	outcomes of the course. D principles and methods to molecular evolutionary and	emonstrate general understanding aught in the course. Basic skills	ficient for accomplishing most of the goal of the subject. Show some ability to comb in possession and application of the millity to collect, systematize, analyze and a skills.	bine and to apply theories, nethods and software for
	D				
	Fail	course. Demonstrate very principles, and methods to	r poor or no understanding of th aught in the course. Poor or no sk alysis of real data. Show very poor	accomplishing the goals and expected ne subject. Show no ability to combine kills in possession and application of the r or no ability to collect data from other so	and/or to apply theories, methods and software for
Course Type	Lactura wi		rappropriately. Very poor or no pre	esentational skills.	burces and to systematize,
	Lecture wi	ith laboratory compone		esentational skills.	ources and to systematize,
Course Teaching	Activities			esentationai skiiis.	No. of Hours
Course Teaching	-		nt course	esentationai skiiis.	
Course Teaching	Activities Lectures Laborator	s Ty	nt course		No. of Hours
Course Teaching	Activities Lectures Laborator	, ·	nt course  Details		No. of Hours
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Laborator	y Self study	nt course  Details		No. of Hours 24 36
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborator Reading /	s 'Y ' Self study	nt course  Details  computer laboratory/tutor	rial/projects  Weighting in final	No. of Hours 24 36 100 Assessment Methods
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Laborator Reading / Methods	s Ty Self study	nt course  Details  computer laboratory/tutor	rial/projects  Weighting in final course grade (%)	No. of Hours  24  36  100  Assessment  Methods to CLO Mapping
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activities Lectures Laborator Reading / Methods  Assignme Examinati Nei M., Ku	s  y Self study ents ion	nt course  Details  computer laboratory/tutor  Details  Duttion and Phylogenetics (0	weighting in final course grade (%)	No. of Hours  24  36  100  Assessment Methods to CLO Mapping CLO 2,3,4 CLO 1,2,3
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials Course Website	Activities Lectures Laborator Reading / Methods  Assignme Examinati Nei M., Ku Trees Mac TBC	s // Self study ents ion umar S.: Molecular Evo	nt course  Details  computer laboratory/tutor  Details  Duttion and Phylogenetics (0	Weighting in final course grade (%)  40 60	No. of Hours  24  36  100  Assessment Methods to CLO Mapping CLO 2,3,4 CLO 1,2,3

BIOL4505	Oyster aquaculture: business and technology (6 credits)	Academic Year	2017
Offering Department	Biological Sciences	Quota	20
Course Co-ordinator	Dr V Thiyagarajan, Biological Sciences (rajan@hku.hk)		
Teachers Involved	(Dr V Thiyagarajan, School of Biological Sceinces)		
Course Objectives	<ul> <li>-Introduce oyster biology and hatchery technology and aquaculture busines</li> <li>-Provide scientific basis for oyster aquaculture through field demonstrations</li> <li>-Enable students to design, construct and maintain oyster hatchery for aquaculture and restoration of wild oysters;</li> <li>-Facilitate transfer of academic knowledge to oyster growers and aquaculture safe sea-food production;</li> <li>-Evaluate and assess novel information, consider risk assessment and profused</li> </ul>	and laboratory exerci- production of seeds are industry for sustain	s for sustainable
Course Contents & Topics	This experiential learning course is to enhance students' knowledge in appl and aquaculture business. This will enable students to design, construct, of facilities and small-scale "green and environmentally sustainable" busine interdisciplinary endeavor encompassing larval hatchery technology, seafor coastal aquaculture business. After learning about basic oyster biology and on how marine larvae are useful for human society through hatchery technoronmental issues, legislation pertaining to coastal aquaculture business covered using oyster aquaculture in Hong Kong as an example. Students in Hong Kong and will be taken to Penang (Malaysia) and Qingdao (Caquaculture. This course is designed to meet the needs of an expanding a Hong Kong. Students will be exposed to a unique learning environment in teachers from Universiti Sains Malaysia (USM) and or Institute of Oceanolo range of expertise, culture, and learning opportunities. Career and saquaculture industry will be discussed.	perate and maintain of the series for shellfish produced quality and econory oyster aquaculture to chnology and in aquates and community interwill be exposed to aquinna) to learn practicated sustainable aquaculturing not only HKU gy (China), bringing w	syster aquaculture action. This is an incidence of pics, we will focus culture business. action will also be uaculture facilities al skills of oyster ulture business in teachers but also ith them a diverse
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 gain scientific knowledge required for setting up oyster hatchery, far understanding biology and ecology of larvae and shellfishes and con hatchery and farming CLO 2 acquire skills and experiential learning opportunities (e.g. hands-on in oyster hatchery and aquaculture business, farming and industry CLO 3 explain the importance of oyster farming in coastal habitat restoratic CLO 4 plan and execute a commercially important research project in mari	onsider potential envi experiences at labora on ne science and coasta	ronmental effects tories and farms) Il aquaculture
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL3109 or BIOL3203 or BIOL3301 or BIOL3303 or ENVS3004 or and Pass in at least 24 credits of advanced level disciplinary core/elective Major or Environmental Science Major or Biological Science Major. Not for students who have passed in BIOL3505	ENVS3313;	•
Offer in 2017 - 2018	N Offer in 2018 - 2019 : Y	Examination	
Grade Descriptors	Evidence of original thought during the analysis of larval biology issue	. Chou ovidence of an	

(A+ to F)	A	outcomes. Demonstrate excellent ability to apply what you have learned in the class room to critically analyze the larval biology project data. Show highly effective organizational, presentational and field trip skills.					
	В	B Show substantial knowledge and thought during the analysis of marine life science issues. Show some evidence of some analytical, critical and multidimensional thinking about the study subject. Good knowledge and skills required for attaining all the course learning outcomes. Demonstrate good ability to apply what you have learned in the class room to critically analyze the real marine life science issues. Show effective organizational, presentational and field trip skills.					
	С	and skills required for attain	te knowledge and original thought during the an ing all the course learning outcomes. Demonstrace the real marine life science issues. Show con	ate fair ability to apply what yo	ou have learned in the		
	D	Evidence to show a minimum knowledge (i.e. knowledge is very incomplete) and thought during the analysis of marine life science issues. Show insufficient knowledge and skills required for attaining all the course learning outcomes. Demonstrate poor ability to apply what you have learned in the class room to critically analyze the real marine life science issues. Show very little organizational, presentational and field trip skills.					
	Fail	and skills required for attain class room to critically analy	equate knowledge and understanding of marine ing all the course learning outcomes. Demonstr yze the real marine life science issues. Show no s, or any knowledge of organizational and presen	ate no ability to apply what yo evidence of familiarity with rel	ou have learned in the		
Course Type	Field camp	os					
Course Teaching & Learning Activities	Activities		Details		No. of Hours		
	Lectures		including tutorial		40		
	Field work				50		
	Laboratory work		hands on training		30		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Practical	25	CLO 3,4		
	Report		Presentation: developing innovative ideas for sustainable and economically viable aquacultre in Hong Kong	50	CLO 4,5		
	Test		Written exam.	25	CLO 1,2		
Required/recommended reading and online materials			ironment (S.E. Shumway, John Wiley & n Spencer, John Wiley & Sons)	Sons)	·		
Course Website	http://www	biosch.hku.hk/ecology/	lsc/				
Additional Course Information	-Taught ar	nd trained by several tea	achers, guest lecturers from governmen I field trips in Hong Kong	t and aquaculture busin	ess sector		
		Lectures and field trips					
		Lecture and field trips in					
	Offer in alt	ternate year from 2017-2		availability of teachers			

BIOL4861	Ecology & biodiversity internship (6 credits)  Academic Ye				ar 2017				
Offering Department	Biological	Sciences		Quota					
Course Co-ordinator	Dr T Veng	Or T Vengatesen, Biological Sciences <i>(rajan@hku.hk)</i>							
Teachers Involved	(All acader	(All academic staff in Ecology & Biodiversity Major,Biological Sciences)							
Course Objectives	knowledge	To provide a stimulating experience for all Ecology & Biodiversity Major undergraduates to integrate and apply their knowledge and skills obtained from the Ecology & Biodiversity Major through gaining work experience in the field of Ecology & Biodiversity that are related to the major of study.							
Course Contents & Topics	University obtained b	Students taking this course will work as an intern for at least 160 hours within the University or outside the University in a company, government department or NGO. The internship may be arranged by the School or obtained by students themselves. In the latter case, the internship must be in a relevant field to the Ecology & Biodiversity Major that the students are taking and prior approval by the course coordinator is required.							
Course Learning	On succes	ssful completion of this	s course, students should be able to:						
Outcomes	CLO 1 ga	ain first hand work exp	perience in a job placement related to the	heir Ecology & Biodiversi	ty Major				
	CLO 2 ap	ply the knowledge in	their Ecology & Biodiversity Major in so	olving practical problems	in the work place				
	CLO 3 ac	quire an understandir	ng and appreciation of the real work en	vironment					
	CLO 4 ex	tend their network in	their field of study						
(and Co-requisites and Impermissible combinations)	The earlies	st that a student is all	odiversity Major students only. owed to take this course is their Year 3						
	Y 1st :	cam 2nd cam Sur	mmer Offer in 2018 - 2019 : Y	Examination					
					No Exam				
Offer in 2017 - 2018 Grade Descriptors (Pass /Pass with distinction	Pass	Able to apply knowledge assigned by supervisor(s the job. Successfully fulfi and evaluation by superv	to solve problems in the workplace. Successfulls), Establishes effective collaboration and commills the requirements set out in the Course Descisor(s), etc.	y handles and carries out the w nunication with supervisor(s), c ription regarding working hours	ork required in the job or olleagues, and clients in s, written and oral report,				
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass Fail	Able to apply knowledge assigned by supervisor(s the job. Successfully fulfi and evaluation by superv Very limited or no ability by supervisor(s). Falls to job. Falls to satisfy the evaluation by supervisor(	to solve problems in the workplace. Successfulls). Establishes effective collaboration and commills the requirements set out in the Course Descrisor(s), etc. to solve problems in the workplace. Fails to han establish effective collaboration or communicative requirements set out in the Course Description	y handles and carries out the w nunication with supervisor(s), c ription regarding working hours dle or carry out the work requir on with supervisor(s), other col	ork required in the job or olleagues, and clients in s, written and oral report, ed in the job or assigned leagues, or clients in the				
Grade Descriptors (Pass /Pass with distinction /Fail)  Course Type	Pass Fail Internship	Able to apply knowledge assigned by supervisor(s the job. Successfully fulfi and evaluation by superv Very limited or no ability by supervisor(s). Fails to job. Fails to satisfy the evaluation by supervisor(	to solve problems in the workplace. Successfulls). Establishes effective collaboration and commills the requirements set out in the Course Descrisor(s), etc. to solve problems in the workplace. Fails to han establish effective collaboration or communicati requirements set out in the Course Description (s), etc	y handles and carries out the w nunication with supervisor(s), c ription regarding working hours dle or carry out the work requir on with supervisor(s), other col	ork required in the job or olleagues, and clients in s, written and oral report, ed in the job or assigned leagues, or clients in the itten and oral report, or				
Grade Descriptors (Pass /Pass with distinction /Fail)  Course Type Course Teaching	Pass Fail Internship Activities	Able to apply knowledge assigned by supervisor(s the job. Successfully fulfi and evaluation by superv Very limited or no ability by supervisor(s). Fails to job. Fails to satisfy the evaluation by supervisor(s)	to solve problems in the workplace. Successfulls). Establishes effective collaboration and commills the requirements set out in the Course Descrisor(s), etc. to solve problems in the workplace. Fails to han establish effective collaboration or communicati requirements set out in the Course Descriptions), etc  Details	y handles and carries out the w nunication with supervisor(s), c ription regarding working hours dle or carry out the work requir on with supervisor(s), other col	ork required in the job or olleagues, and clients in , written and oral report, ed in the job or assigned leagues, or clients in the itten and oral report, or No. of Hours				
Grade Descriptors (Pass /Pass with distinction /Fail)  Course Type Course Teaching & Learning Activities	Fail Internship Activities Internship	Able to apply knowledge assigned by supervisor(s the job. Successfully fulfi and evaluation by superv Very limited or no ability by supervisor(s). Fails to job. Fails to satisfy the evaluation by supervisor(s)	to solve problems in the workplace. Successfulls). Establishes effective collaboration and commills the requirements set out in the Course Descrisor(s), etc. to solve problems in the workplace. Fails to han establish effective collaboration or communicati requirements set out in the Course Description (s), etc	y handles and carries out the w nunication with supervisor(s), c ription regarding working hours dle or carry out the work requin on with supervisor(s), other col n regarding working hours, wr	ork required in the job or olleagues, and clients in s, written and oral report, ed in the job or assigned leagues, or clients in the itten and oral report, or				
Grade Descriptors (Pass /Pass with distinction	Pass Fail Internship Activities	Able to apply knowledge assigned by supervisor(s the job. Successfully fulfi and evaluation by superv Very limited or no ability by supervisor(s). Fails to job. Fails to satisfy the evaluation by supervisor(s)	to solve problems in the workplace. Successfulls). Establishes effective collaboration and commills the requirements set out in the Course Descrisor(s), etc. to solve problems in the workplace. Fails to han establish effective collaboration or communicati requirements set out in the Course Descriptions), etc  Details	y handles and carries out the w nunication with supervisor(s), c ription regarding working hours dle or carry out the work requir on with supervisor(s), other col	ork required in the job or olleagues, and clients in , written and oral report, ed in the job or assigned leagues, or clients in the itten and oral report, or No. of Hours				
Grade Descriptors (Pass /Pass with distinction /Fail)  Course Type Course Teaching & Learning Activities Assessment Methods	Fail Internship Activities Internship	Able to apply knowledge assigned by supervisor(s the job. Successfully fulfi and evaluation by superv Very limited or no ability by supervisor(s). Fails to job. Fails to satisfy the evaluation by supervisor(s) to work	to solve problems in the workplace. Successfulls). Establishes effective collaboration and commills the requirements set out in the Course Descrisor(s), etc. to solve problems in the workplace. Fails to han establish effective collaboration or communicati requirements set out in the Course Description (s), etc.    Details   at least 160 hours	y handles and carries out the w nunication with supervisor(s), c ription regarding working hours dle or carry out the work requin on with supervisor(s), other col n regarding working hours, wr	ork required in the job or olleagues, and clients in s, written and oral report, ed in the job or assigned leagues, or clients in the itten and oral report, or   No. of Hours  160  Assessment Methods				

Additional	Course
Information	n

Students taking this course have to submit a written report of not less than 1,000 words and an oral presentation about their internships, which will be assessed by internal supervisors. Student's supervisor at work i.e. the institution offering the internship will also submit an assessment report to the University. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator. BIOL4861 E&B internship is not a Capstone Course.

BIOI 4011	Concor	ration colones in	action (6 aradita)	Academic Ye	ar 2017	
BIOL4911		ration science in pra	ictice (6 credits)			
Offering Department	Biological		one (vine day of Oblay bla)	Quota	9	
Course Co-ordinator		adovy, Biological Science	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
Teachers Involved		Sadovy, School of Biologi	•			
Course Objectives			ed by students in the Biological Scie			
	environmental science by using case studies that stimulate them to integrate the principles and concepts learned to produce and successfully debate a topic in conservation science. Case studies will specifically address the use o					
		•	•			
		9	conservation outcomes taking int		•	
		-	Students will be expected to preser s a capstone course for Ecology & I		•	
Course Contents		-	studies to give students the oppor			
& Topics			and the application of conservation			
a ropios			elopment, political considerations			
			with local organizations, such a		, ,	
		<u> </u>	sues. Possible case studies range f	0 0		
			conservation risk, effectiveness of			
	instrumen	ts, and the relationship I	between biodiversity and human liv	elihoods. Tutorials by the	course coordinato	
			on concepts, develop critical thinki			
	across cas	se studies.				
Course Learning			ourse, students should be able to:			
Outcomes	CLO 1 ha	ive an in-depth underst	tanding of the topic studied, the	major issues involved a	nd the needs and	
	pr	ospects for further work	in the area			
			tive skills associated with the ca-	se study selected which	include synthesis,	
		ganization and presenta				
			e and complexities of conserving bid			
		, ,	ctical and scientifically defensible	initiatives and measur	es for successful	
		nservation intervention				
			esent the case study and convincing			
Pre-requisites			anced level disciplinary core/elective	⁄e biological sciences coι	ırses (BIOL3XXX o	
(and Co-requisites		,	versity Major including BIOL3303.			
and Impermissible			yy & Biodiversity Major students onl			
combinations)			ed to take this capstone course is the		N. E.	
Offer in 2017 - 2018		I sem Offer in 2018 - 2		Examination	No Exam	
Grade Descriptors	Α		ery at an advanced level of extensive know alvtical and critical abilities and logical thi			
(A+ to F)		outcomes. Show strong analytical and critical abilities and logical thinking, with strong evidence of ability to integrate and synthesize information across subject areas, including from practical work undertaken, and ability to apply knowledge to a wide				
		range of complex, familiar and unfamiliar situations and showing consideration of practical and political dimensions for				
		addressing conservation challenges. Apply highly effective presentational skills. Strong evidence of attention to thoughtful and reflective thinking and consideration of the wider issues of biodiversity conservation for Society.				
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course					
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, with some integration of materials and					
	ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Some evidence of clear attention to thoughtful and reflective thinking and attention to detail. Consideration of practical components in					
	conservation management must be demonstrated including the importance of biodiversity conservation in Society.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning					
	outcomes. Show evidence of some analytical and critical abilities and logical thinking, ability to apply knowledge to most familiar					
		situations and of relevance of biodiversity conservation for Society. Apply moderately effective presentational skills and understanding of the practical challenges of effective conservation initiatives. Little evidence of clear attention to thoughtful and				
	reflective thinking.					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.					
		Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Have basic understanding of importance of biodiversity for Society. Show limited ability to apply knowledge to solve				
	problems or consider the practical challenges of biodiversity conservation. Apply limited effectiveness in presentational skills.					
	F-:-	Lack of attention to thoughtful	ul and reflective thinking. ence of command of knowledge and skills r	aguired for attaining the course	loorning outcomes I ask	
	Fail		ilities, logical and coherent thinking or att			
			ng to solve problems. Organization and pres			
Course Type	Project-ba	ised course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities			supervised practical work of at lea			
	Reading /	Self study	written & oral reports. Tutorials	s provided by course	120	
			coordinator			
Assessment Methods	Methods		Details	Weighting in final	Assessment	
and Weighting				course grade (%)	Methods	
					to CLO Mapping	
	Oral pres	entation		40	CLO 1,2,4,5	
	Research	report	project report	60	CLO 1,2,3,4,5	
Course Website	http://www	v.biosch.hku.hk/ecology/	lsc/			
Additional Course	Offer in al	ternate year from 2017-2	2018			
Information	This cours	se will be offered subject	to a minimum enrollment number a	and availability of teachers		
	The decide in the dispersion of the international internationalistina international international international international in					

BIOL4912	Sensory evaluation of food (6 credits)	Academic Year	2017		
Offering Department	Biological Sciences Quota 15				
Course Co-ordinator	Dr J C Y Lee, Biological Sciences (jettylee@hku.hk)				
Teachers Involved					
Course Objectives	To provide a broad understanding of the physiological and psychological basis of human sensory				

		· · · · · · · · · · · · · · · · · · ·	od science and consumer resear		P1		
Course Contents			July in a 2-week intensive worksh		,		
& Topics	in mainland China, to enable close study of food products in the Chinese marketplace. Preliminary lectures will take place at the University of Hong Kong. Physiology and psychology of sensory						
					- lala		
			ng and conduct of sensory testing				
			testing. Instrument-sensory relati				
			life studies, expert panels. Cament and consumer research	ase studies of sensory appli	cations in product		
Course Learning		development, quality management, and consumer research.  On successful completion of this course, students should be able to:					
Outcomes	CLO 1 u	nderstand the psycho	ophysiological basis for human se	ensory perception of food			
	CLO 2 u	nderstand the major	techniques used in sensory testir	ng			
		nterpret sensory eva ppropriately chosen	aluation reports, and to design methods	and conduct sensory evalua	tion projects using		
Pre-requisites		SIOL3201; and					
and Co-requisites		,	advanced level disciplinary core.	/elective biological sciences co	urses (BIOL3XXX o		
and Impermissible			rional Science Major.	S .	`		
combinations)	This caps	stone course is for Fo	ood & Nutrional Science Major stu	idents only.			
•	The earlie	est that a student is a	allowed to take this capstone cour	rse is their year 3 study.			
Offer in 2017 - 2018	N Off	·					
Grade Descriptors	Α		grasp of the subject matter covered. Sho				
(A+ to F)		evidence of creative a	bility and competence in professional-lev	vel problem solving. Critically use lab s	skills and techniques and		
		analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.					
	В						
	thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis o data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based						
	organizational and presentational skills.  C Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities						
	and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate						
		moderately effective team-based organizational and presentational skills.					
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and					
		techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world					
		problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.					
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.						
Course Type	Laborator	ry and workshop cou	-				
Course Teaching	Activitie	s	Details		No. of Hours		
	Laborato	ry					
	Project w	vork					
	Tutorials		lactures/tutorials	lectures/tutorials			
	lutorials		iectures/tutoriais		24		
& Learning Activities		/ Self study	lectures/tutorials		24 30		
& Learning Activities		•	Details	Weighting in final			
& Learning Activities  Assessment Methods	Reading	•		Weighting in final course grade (%)	30 Assessment Methods		
& Learning Activities  Assessment Methods	Reading Methods	, S			30 Assessment Methods to CLO Mapping		
& Learning Activities  Assessment Methods	Reading Methods Laborato	ory reports		course grade (%)	30 Assessment Methods to CLO Mapping CLO 2,3		
& Learning Activities  Assessment Methods	Reading Methods	ory reports		course grade (%)	Assessment Methods to CLO Mapping CLO 2,3 CLO 2,3		
& Learning Activities  Assessment Methods  and Weighting	Reading Methods Laborato Project re Test	s ory reports eports	Details	course grade (%)  20 60 20	30 Assessment Methods to CLO Mapping CLO 2,3		
& Learning Activities  Assessment Methods and Weighting  Required/recommended	Reading Methods  Laborato Project re Test Stone, H.	ory reports eports and Sidel, J.L. (200	Details  4) Sensory Evaluation Practices 3	course grade (%)  20 60 20  Brd edition - Elsevier	30 Assessment Methods to CLO Mapping CLO 2,3 CLO 2,3		
& Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Reading Methods  Laborato Project re Test Stone, H.	ory reports eports and Sidel, J.L. (200	Details	course grade (%)  20 60 20  Brd edition - Elsevier	30 Assessment Methods to CLO Mapping CLO 2,3 CLO 2,3		
	Reading Methods  Laborato Project re Test Stone, H. Lawless,	ory reports eports and Sidel, J.L. (2004 H.T. (2013) Laborato	Details  4) Sensory Evaluation Practices 3	course grade (%)  20 60 20  Brd edition - Elsevier	30 Assessment Methods to CLO Mapping CLO 2,3 CLO 2,3		
A Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Reading Methods  Laborato Project re Test Stone, H. Lawless,	ory reports eports and Sidel, J.L. (2004 H.T. (2013) Laborato	Details  4) Sensory Evaluation Practices 3	course grade (%)  20 60 20  Brd edition - Elsevier tion - Springer	30 Assessment Methods to CLO Mapping CLO 2,3 CLO 2,3 CLO 1,2,3		

BIOL4913	Advanced practicum on food and nutrient analysis (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota	20			
Course Co-ordinator	Dr J C Y Lee, Biological Sciences (jettylee@hku.hk)					
Teachers Involved	(Dr El-Nezami Hani,School of Biological Sciences) (Dr J C Y Lee,School of Biological Sciences)					
Course Objectives	Food products are analysed to follow the compliance with legal and labelling requirements, assessment of product quality, determination of nutritive value, research and development. The lectures and laboratory sessions will cover the analytical procedures and techniques used to provide information about the food labelling and toxicology of the products. The purpose of the laboratory classes is to give students experience in direct performance of food analysis and toxicology experiments, analysing data and reporting their findings. The students are to work individually on food products where they will analytically assess components using advanced techniques necessary for basic labelling of food products.					
Course Contents & Topics	Key lectures on specific techniques and cases studies demonstrating the potential and pitfalls on analytical techniques and contaminant assessment for certain class of foods or food components will be discussed. Students will have hands-on experience in analysing food products and will utilise analytical techniques under AOAC or equivalent methods. The students will learn how mycotoxins assays, allergens and genetically modified raw materials are assessed in food products. In-depth learning in the use of different chromatography and mass spectrometry techniques, ELISA and procedures for sample preparations will be provided in the course.					
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 Be familiar with the food labeling system CLO 2 Understand the use of appropriate analytical techniques for food analy CLO 3 Have knowledge of a variety of analytical techniques for evaluation of CLO 4 Have a detailed knowledge of the state of the art of the most i	sis food products				

	CLO 5 A	ble to perform risk as:	sessment and compare the	outcomes with governme	ental regulate	d levels		
Pre-requisites (and Co-requisites and Impermissible combinations)	BIOL4XX This caps	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) included BIOL3207 and / or BIOL3209 in the Food & Nutrional Science Major. This capstone course is for Food & Nutrional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.						
Offer in 2017 - 2018	Y 2n	d sem Summer Of	ffer in 2018 - 2019 : Y	Ex	camination	No Exam		
Grade Descriptors (A+ to F)	A Demonstrate a thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.							
	В	thinking with some evide	Il grasp of the subject matter co ence of competence in professiona raw generally appropriate conclu- entational skills.	al-level problem solving. Use la	ib skills and tech	nniques and analysis of		
	С	and logical thinking with data and results to dra	It incomplete grasp of the subject limited competence in profession w moderately appropriate but sor m-based organizational and prese	al-level problem solving. Use la metimes erroneous conclusions	ab skills and tech	nniques and analysis of		
	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.							
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.							
Course Type	Lecture v	vith laboratory compor	nent course					
Course Teaching	Activitie	s	Details			No. of Hours		
& Learning Activities	Lectures					24		
	Laborato	ory				48		
	Reading	/ Self study				100		
Assessment Methods and Weighting	Methods	3	Details	Weighting course g		Assessment Methods to CLO Mapping		
	Project r	eport		50	0	CLO 1,2,3,4		
	Test	•		50	0	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Y. Pico, 0	Chemical Analysis of F	h Edition (2010 Springer US Food Techniques and Applic AOAC International 19th Ec	cations (2012, Knovel, Sc				
Course Website		odle.hku.hk		· · ·				
Additional Course Information	The cour 2nd Sem		ect to a minimum enrollmen	t number and availability	of teachers.			

BIOL4921	Animal behaviour and behavioural ecology: field course (6 credits)  Academic Year 2017					
Offering Department	Biological Sciences	Quota	15			
Course Co-ordinator	Dr L Karczmarski, Biological Sciences (leszek@hku.hk)					
Teachers Involved						
Course Objectives	This course is offered as a capstone experience and unique experiential learning opportunity. It introduces students to scientific reasoning and conceptual basis of studying animal behaviour and behavioural ecology. It exposes students to 'research-in-making' and 'day-to-day logistics' of a field research, with all the excitement it generates and all demanding challenges it brings along, with hands-on experience in designing, conducting, analysing, and successfully completing field studies of animal behaviour and behavioural ecology.					
Course Contents & Topics	Conducted in a field research site outside Hong Kong, this course teaches students how to think analytically about animal behaviour, how to design a field research protocol, construct a conceptual framework of a research project and how to put this framework into a practice of collecting and analysing data. The course includes lectures, informal discussions, review of research techniques, and extensive field component with daily research activities. It provides experiential learning through (i) direct participation in an ongoing field-based research, (ii) hands-on experience in application of diverse research techniques, (iii) hands-on involvement in collecting and analysing data, and (iv) engagement in scientific debates with researchers and research teams directly in their field study location. Students will be guided through the scientific reasoning and methodology, will learn a suite of research techniques and will exercise their skills in data gathering and interpretation, and will develop an understanding how individual research projects contribute to a greater understanding of behavioural and evolutionary processes and contribute to advancing science at large. The emphasis is placed on independent thinking and thoughtful application of the knowledge acquired previously during relevant classroom courses. Following the field-based component, students are required to give a seminar-type presentation on a selected topic and write a Course					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 understand of the biodiversity and primary habitats in the ecosystem stu	ıdied				
	CLO 2 establish the basic skills needed to identify target species associated with the field course					
	CLO 3 be knowledgeable about and able to implement sampling techniques for organisms in the particular ecosystems studied					
	CLO 4 understand the basic ecology of target species and how biotic and abiotic factors shape focal communities					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL3101; and Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Ecology & Biodiversity Major. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2017 - 2018	N Offer in 2018 - 2019 : N	Examination				
Grade Descriptors (A+ to F)	A Evidence of a thorough grasp of the subject and relevant research techniques. Eage familiarity with relevant background reading and case studies. Exemplary handling o skills. Ample evidence of independent critical thought with excellent use of a broad comparative perspective to draw insightful and logical conclusions. Show outstand	f field data collection an range of fundamental c	d excellent analytical oncepts and broader			

	B C D	level.  Evidence of a good grasp of with relevant background in Good evidence of critical tonsideration of broader of presentation skills with logic Demonstrate an adequate, relevant background readin critical thinking (although in Fair presentation skills, wit sufficient for what is require Demonstrate some grasp research techniques. Some abilities of critical independability of drawing appropriat No evidence of basic a in background reading and in thought; ineffective present reach degree level.	ellent analytical argumentation. Excellent or or of the subject and relevant research technique eading and case studies. Good handling of finhought (although not always independent), womparative perspective in drawing logical concard and analytical argumentation. Work more the but incomplete grasp of the subject and religiant of always independent), with mostly good use the mostly correct argumentation, but limited of for degree level.  of the subject, but only partial and with limite framiliarity with relevant case studies, but insent thinking. Ineffective presentation skills with econclusions. Work barely meets what is requininimum grasp of the subject and the minimum grasp of the subject and the minimum grasp of the subject and the minimum skills with poor argumentation and no a	s. Interest in learning and goo- eld data collection and comme ith an appreciable use of fun clusions. Good abilities of inde an sufficient for what is require evant research techniques. No peyond the adequate average I of fundamental concepts to or no) abilities to integrate be ad understanding of relevant sufficient evidence of backgroin generally weak logical argur ired at degree level. num relevant research techn ase studies. Inadequate evide	d-to-moderate familiarity endable analytical skills. damental concepts and ependent work, effective id at degree level. Moderate familiarity with level. Evidence of logical iraw logical conclusions. Toroader concepts. Work research concepts and und reading and limited mentation with restricted siques. No evidence of ence of coherent logical
Course Type	Field cam				
Course Teaching & Learning Activities	Activities	3	Details		No. of Hours
	Lectures		lectures and tutorials		10
	Field wor				72
	Presentation		interactive debates		10
	Reading / Self study				100
	Assessm		group project		15
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents		35	CLO 1,2,3,4
	Report		project report (35%), group investigation & presentation (30%)	65	CLO 1,2,3,4
Required/recommended reading and online materials	Required/recommended reading and online materials (at most 400 characters) Lehner, P.N. 1996 (reprint 2002). Handbook of ethological methods. Cambridge University Press. Dugatkin, L.A. (ed.) 2001. Model systems in behavioral ecology. Integrating conceptual, theoretical, and empirical approaches. Princeton University Press. Yamagiwa, J. & Karczmarski, L. (eds.) 2014. Primates and Cetaceans: Field research and conservation of complex mammalian societies. Springer Science.				
Course Website		v.biosch.hku.hk/ecology.	/lsc/		
Additional Course					
Information	submit a l not later ti 1. Person 2. ID phot 3. Brief de 4. GPA 5. Pre-rec All applica	Enrollment Procedure: The course is open to enrollment only during the add/drop period of the 2nd semester. Students are require submit a brief (maximum 1-page) application letter (PDF file) via e-mail to the Course Coordinator (leszek@hkinot later than 10th January. The application shall include the following:  1. Personal and academic details  2. ID photograph  3. Brief description of academic interests  4. GPA  5. Pre-requisite courses taken and grades received (if pre-requisites are not met, a reasoned request for wai All applications will be reviewed prior to the commencement of the 2nd semester and results will be announ within the 1st week of the add/drop period of the 2nd semester.			

BIOL4922	Food pro	duct development and evaluation (6 cred	lits)	Academic Year	2017		
Offering Department	Biological		•	Quota	20		
Course Co-ordinator	Dr M F Wa	ng, Biological Sciences (mfwang@hku.hk)					
Teachers Involved	(Dr M F W	ng,Biological Sciences)					
Course Objectives		ee the key concepts and techniques used in for in the design, development and production of a ne		opment. To prov	ide small group		
Course Contents & Topics	prototype o	History and future of the food industry; industrial product development process; idea generation and prototype development for new food products; quality management and legal protection; marketing strategies; food labeling; food package design; new product development for different food industries.					
Course Learning Outcomes	CLO 1 ur CLO 2 kr	ful completion of this course, students should be a derstand the food product development cycle by the key steps in new product development monstrate enhanced insight and understanding of		trends in the food	industry		
		CLO 4 have professional level practical experience in new product development CLO 5 know the main characteristics of different sectors of the food industry					
Pre-requisites (and Co-requisites and Impermissible combinations)	BIOL4XXX This capsto The earlies	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) included BIOL3203 and / or BIOL4205 in the Food & Nutritional Science Major.  This capstone course is for Food & Nutritional Science Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.  Not for students who have passed in BIOL4210 Food product development.					
Offer in 2017 - 2018		em Offer in 2018 - 2019 : Y		Examination	Dec		
Grade Descriptors (A+ to F)	A	A Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinki evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and technique analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly team-based organizational and presentational skills.					
	B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and lot thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analytical and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-batogranizational and presentational skills.				ques and analysis of fective team-based		
	С	Demonstrate general but incomplete grasp of the subject matt and logical thinking with limited competence in professional-le data and results to draw moderately appropriate but sometir moderately effective team-based organizational and presentati	vel problem solving. Us mes erroneous conclus	se lab skills and techni	ques and analysis of		

	D Fail	evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.  Pail Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectively heading generally to inappropriate and usually erroneous conclusions to real-world problems.					
Course Type	Laboratory						
Course Type Course Teaching	Activities	and workshop course	Details		No. of Hours		
& Learning Activities	Laboratory		Details		48		
3	Group wor		80-100 hours group project work		100		
	Tutorials		6 lectures + 6 tutorials		12		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Assignments assessment of group product development project including food product presentation	100	CLO 1,2,3,4,5		
Required/recommended reading and online materials	E. Graf and	A. L. Brody and J. B. Lord: Developing New Food Products for a Changing Marketplace (CRC Press, 2007)  E. Graf and I. S. Saguy: Food Product Development (Avi Books, 1991)  G. W. Fuller: New Food Product Development (CRC Press, 2005)					
Course Website	http://mood	lle.hku.hk/	· · · · ·				
Additional Course Information	This course	s course will be offered subject to a minimum enrollment number and availability of teachers.					

BIOL4962	Food &	nutritional science	internship (6 credits)	Academic Year	r  2017		
Offering Department	Biological	Sciences		Quota			
Course Co-ordinator	Dr J C Y L	ee, Biological Sciences	s (jettylee@hku.hk)				
Teachers Involved		All academic staff in Food & Nutritional Science Major,Biological Sciences)					
Course Objectives	their know	To provide a stimulating experience for all Food & Nutritional Science Major undergraduates to integrate and apply their knowledge and skills obtained from the Food & Nutritional Science Major through gaining work experience in the field of Food & Nutritional Science that are related to the major of study.					
Course Contents & Topics	University arranged I field to the	or outside the University or outside the University or obtain	work as an intern for at least 160 hrsity in a company, government de ed by students themselves. In the lat Science Major that the students ar	epartment or NGO. The inter case, the internship mu	nternship may be ust be in a relevan		
Course Learning	On succes	ssful completion of this	course, students should be able to:				
Outcomes	CLO 1 ga	nin first hand work expe	rience in a job placement related to tl	neir Food & Nutritional Scie	ence Major		
	CLO 2 ap	oply the knowledge in tace	heir Food & Nutritional Science Maj	or in solving practical prob			
		·	and appreciation of the real work en	vironment			
		tend their network in th	•				
Pre-requisites			vanced level disciplinary core/electiv	e biological sciences cours	ses (BIOL3XXX o		
(and Co-requisites		X) in the Food & Nutrition	•	a mlu			
and Impermissible combinations)			& Nutritional Science Major students wed to take this capstone course is the				
Offer in 2017 - 2018			mer Offer in 2018 - 2019 : Y	Examination	No Exam		
Grade Descriptors	Pass		solve problems in the workplace. Successfull				
(Pass /Pass with distinction /Fail)	Fail	and evaluation by supervisof "Distinction".  Very limited or no ability to by supervisor(s). Fails to each	the requirements set out in the Course Descor(s), etc. Students demonstrating excellent solve problems in the workplace. Fails to han stablish effective collaboration or communicat quirements set out in the Course Description	performance in the above would dle or carry out the work required ion with supervisor(s), other collection	I in the job or assigned agues, or clients in the		
Course Type	Internship	, , ,	, 616				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Internship work		at least160 hours (lunch hour excluded) in at least 20 working days				
<b>J</b>		WOIK	`	cidded) iii at least 20	160		
Assessment Methods and Weighting	Methods	, work	`	Weighting in final course grade (%)			
Assessment Methods	<u>'</u>		working days	Weighting in final	160 Assessment Methods		
Assessment Methods	Methods Written re		working days  Details  written report, employer's	Weighting in final course grade (%)	160 Assessment Methods to CLO Mapping		

BIOL4963	Molecular biology & biotechnology internship (6 credits)	Academic Year	2017	

Offering Department	Biological	Sciences		Quota		
Course Co-ordinator	Dr W K Yi	p, Biological Sciences (	wkyip@hku.hk)			
Teachers Involved	(All acade	mic staff in Molecular Bi	ology & Biotechnology Major, Biolog	ical Sciences)		
Course Objectives	and apply	To provide a stimulating experience for all Molecular Biology & Biotechnology Major undergraduates to integrate and apply their knowledge and skills obtained from the Molecular Biology & Biotechnology Major through gaining work experience in the field of Molecular Biology & Biotechnology that are related to the major of study.				
Course Contents & Topics	University arranged I field to the	or outside the Univer by the School or obtaine	work as an intern for at least 160 sity in a company, government doubt by students themselves. In the la iotechnology Major that the student	epartment or NGO. The tter case, the internship n	internship may be nust be in a relevant	
Course Learning	On succes	ssful completion of this of	course, students should be able to:			
Outcomes	CLO 1 ga	in first hand work exper	ience in a job placement related to t	heir Molecular Biology & I	Biotechnology Major	
	wo	ork place	eir Molecular Biology & Biotechnolo		ical problems in the	
			and appreciation of the real work er	nvironment		
		tend their network in the	•			
Pre-requisites			dvanced level disciplinary core / e	elective courses in the M	/lolecular Biology &	
(and Co-requisites		logy Major.	L. Biston & Biston Louis Maison			
and Impermissible			ular Biology & Biotechnology Major			
combinations) Offer in 2017 - 2018			ved to take this capstone course is to ner Offer in 2018 - 2019 : Y	Examination	No Exam	
Grade Descriptors	Pass		solve problems in the workplace. Successful			
(Pass /Pass with distinction /Fail)	assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of "Distinction".					
	Fail  Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work require by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other coll job. Fails to satisfy the requirements set out in the Course Description regarding working hours, wri evaluation by supervisor(s), etc					
		evaluation by supervisor(s),	etc	on regarding working nodis, wi		
Course Type	Internship	evaluation by supervisor(s),	etc	on regarding working nours, wi		
	Internship	, , , , ,	Details	on regarding working flours, wi		
Course Type Course Teaching & Learning Activities		,			itten and oral report, or	
Course Teaching	Activities	,	Details at least 160 hours (lunch hour e		No. of Hours	
Course Teaching & Learning Activities  Assessment Methods	Activities Internship	s work	Details at least 160 hours (lunch hour e working days	xcluded) in at least 20  Weighting in final	No. of Hours 160 Assessment Methods	
Course Teaching & Learning Activities  Assessment Methods	Activities Internship Methods Written re	s work	Details at least 160 hours (lunch hour e working days Details written report, supervisor's	weighting in final course grade (%)	No. of Hours  160  Assessment Methods to CLO Mapping	

BIOL4964	Biological sciences internship (6 credits)	Academic Year	2017			
Offering Department	Biological Sciences	Quota				
Course Co-ordinator	Prof W W M Lee, Biological Sciences (hrszlwm@hku.hk)					
Teachers Involved	(All academic staff in Biological Sciences Major, Biological Sciences)					
Course Objectives	To provide a stimulating experience for all Biological Sciences major undergright knowledge and skills obtained from the Biological Sciences Major through gas Biological Sciences that are related to the major of study.					
Course Contents & Topics	Students taking this course will work as an intern for at least 160 hours in University or outside the University in a company, government department arranged by the School or obtained by students themselves. In the latter case field to the Biological Sciences major that the students are taking and prior a required	it or NGO. The in , the internship mus	ternship may be at be in a relevant			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 gain first hand work experience in a job placement related to their Biological Sciences Major					
	CLO 2 apply the knowledge in their Biological Sciences Major in solving practical problems in the work place					
	CLO 3 acquire an understanding and appreciation of the real work environment					
	CLO 4 extend their network in their field of study					
Pre-requisites (and Co-requisites and Impermissible	Pass in at least 24 credits of advanced level disciplinary core/elective biological BIOL4XXX) in the Biological Sciences Major.  This captsone course is for Biological Sciences Major students only.		es (BIOL3XXX or			
combinations)	The earliest that a student is allowed to take this capstone course is their year	· · · · · · · · · · · · · · · · · · ·	Na Europ			
Offer in 2017 - 2018	Y 1st sem 2nd sem Summer Offer in 2018 - 2019 : Y  Pass Able to apply knowledge to solve problems in the workplace. Successfully handles.	Examination	No Exam			
Grade Descriptors (Pass /Pass with distinction /Fail)	assigned by supervisor(s). Establishes effective collaboration and communication the job. Successfully fulfills the requirements set out in the Course Description reg and evaluation by supervisor(s), etc. Students demonstrating excellent performance of "Distinction".	with supervisor(s), colle arding working hours, w ace in the above would	agues, and clients in ritten and oral report, be awarded a grade			
	Fail  Very limited or no ability to solve problems in the workplace. Fails to handle or carr by supervisor(s). Fails to establish effective collaboration or communication with su job. Fails to satisfy the requirements set out in the Course Description regardin evaluation by supervisor(s), etc	pervisor(s), other collea	gues, or clients in the			
Course Type	Internship					

Course Teaching	Activities	Details	Details at least160 hours (lunch hour excluded) in at least 20 working days		
& Learning Activities	Internship work	,			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Written report	written report, employer's feeback and oral presentation	100	CLO 1,2,3,4	
Course Website	http://moodle.hku.hk				
Additional Course Information	presentation about their inte supervisor at work i.e. the in the University. Satisfactory completion of t be recorded on the studer interested to enrol in this co Enrolment of this course is	have to submit a written report of not less ernships, which will be assessed by internantitution offering the internship will also suthis course can be counted towards the Cant's transcript. This course will be assessourse should contact the Department to obtonot conducted via the online course selected office after approval has been obtained from	al supervisors. Student's abmit an assessment report postone requirement. Det sed on "Pass/Fail" basis ain the approval.	ort to  ails of internship will  Students who are be made through the	

BIOL4991	<b>Ecolog</b>	y & biodiversity	project (12 credits)	Academic Ye	ar 2017	
Offering Department		al Sciences	•	Quota		
Course Co-ordinator	Prof G A	Williams, Biological	Sciences (hrsbwga@hku.hk)			
Teachers Involved	(All acad	(All academic staff in Ecology & Biodiversity Major, Biological Sciences)				
Course Objectives	apply the	To provide a stimulating capstone experience for Ecology & Biodiversity Major undergraduates to integrate and apply their knowledge and skills obtained from the Ecology & Biodiversity Major through planning and carrying ou a research project under the supervision of a member of staff.				
Course Contents & Topics	admissio		al from a prospective supervisor proproved by the course coordinator, heir supervisor.			
Course Learning			this course, students should be ab	le to:		
Outcomes	CLO 2 L CLO 3 C CLO 4 C	use this information t develop and formula design and undertak	ppropriate scientific literature to generate a scientifically relevant te scientific hypotheses to test this e practical research work to formall the data collected to test the hypotheses.	question ly test the hypotheses proposed		
	il	llustrate the outcome	es			
	CLO 6	draw an objective se	ries of conclusions based on the ex	kperimental work		
			their research findings and place t			
	CLO 8 s	submit their work foll	owing a specified journal format, pr	resent their work as a scientific	conference talk	
Pre-requisites and Co-requisites and Impermissible combinations)	and Cumulati Students This cap	ive GPA of 3.0 or ab s are not permitted to stone course is for E	advanced level disciplinary core / e love. b take both BIOL3991 and BIOL499 Ecology & Biodiversity Major studer allowed to take this capstone cours	91. hts only.	& Biodiversity Major	
Offer in 2017 - 2018			018 - 2019 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	Evidence of complete or near-complete understanding and a thorough grasp of the subject matter as demonstrated by attainment of all learning outcomes. Excellent critique and knowledge of relevant literature and identification of research hypothesis. Well designed experimental approach to test research hypothesis. Show excellent organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate comprehensive, critical, assessment of results and professional presentation of research work.  B Evidence of near-complete understanding and a good grasp of the subject matter as demonstrated by attainment of the majority					
	of learning outcomes. Good critique and knowledge of relevant literature and identification of research hypothesis. Appropriately designed experimental approach to test research hypothesis. Show good organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate effective, critical, assessment of results and good presentation of research work.					
	C Evidence of adequate understanding and grasp of the subject matter as demonstrated by general but incomplete attainment of most of the learning outcomes. Acceptable critique and knowledge of relevant literature and identification of research hypothesis. Adequately designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate adequate but not necessarily critical, assessment of results and presentation of research work.					
	D Evidence of limited understanding and grasp of the subject matter as demonstrated by incomplete attainment of many of the learning outcomes. Limited critique and knowledge of relevant literature and identification of research hypothesis. Poorly designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate confused and poorly organized assessment of results and limited presentation of research work.					
	Fail  Evidence of poor or inadequate understanding and grasp of the subject matter such that most of the learning outcomes are not attained. Poor critique and knowledge of relevant literature and identification of research hypothesis. Badly designed experimental approach to test research hypothesis. Show little evidence of appropriate organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate incorrect interpretation and assessment of results and poor presentation of research work.					
Course Type	Project-b	pased course				
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Reading	g / Self study	formal lectures, seminars &	practical work	144	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Disserta	ation		80	CLO 1,2,3,4,5,6,7,8	
	Oral pre	esentation	research seminar	20	CLO 1,2,3,4,5,6,7	
Course Website Additional Course	http://ww	w.biosch.hku.hk/eco				

BIOL4992	Food &	nutritional scie	nce project (12 credits)	Academic Year	r 2017	
Offering Department		l Sciences	· · · · · · · · · · · · · · · · · · ·	Quota		
Course Co-ordinator	Dr J C Y	Louie, Biological S	ciences (jimmyl@hku.hk)			
eachers Involved	(All acade	(All academic staff in Food & Nutritional Science Major, Biological Sciences)				
Course Objectives	To provide a stimulating capstone experience for Food & Nutritional Science Major undergraduates to integrate and apply their knowledge and skills obtained from the Food & Nutritional Science Major through planning and carrying out a research project under the supervision of a member of staff.					
Course Contents & Topics	admissio	Students should seek approval from a prospective supervisor prior to selecting this course. After admission to the course is approved by the course coordinator, students will complete their project work under the guidance of their supervisor.				
Course Learning	On succe	essful completion of	this course, students should be able	to:		
Outcomes	CLO 1 c	ritique and review a	appropriate scientific literature			
	CLO 2 u	se this information	to generate a scientifically relevant re	esearch question		
	CLO 3 d	levelop and formula	ite scientific hypotheses to test this q	uestion		
	CLO 4 d	lesign and undertak	te practical research work to formally	test the hypotheses proposed		
		inalyse and evaluat lustrate the outcom	te the data collected to test the hypo es	theses, present data in a profe	ssional manner t	
	CLO 6 d	Iraw an objective se	eries of conclusions based on the exp	erimental work		
			s their research findings and place the			
	CLO 8 s	ubmit their work fol	lowing a specified journal format, pre	sent their work as a scientific co	nference talk	
Pre-requisites and Co-requisites and Impermissible combinations)	BIOL4XX Cumulation This caps	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Food & Nutritional Science Major; and Cumulative GPA of 3.0 or above.  This capstone course is for Food & Nutritional Science Major students only.				
Man ! 0047 0040			s allowed to take this capstone course		NI- Fire	
Offer in 2017 - 2018 Grade Descriptors	Y Ye	ear long Offer in 2	U18 - 2U19:Y ete or near-complete understanding and a	Examination	No Exam	
(A+ to F)	В	skills and laborator presentation of resea Evidence of near-cor of learning outcomes designed experimer laboratory/fieldwork levidence of adequal most of the learning Adequately designed laboratory/fieldwork	signed experimental approach to test researcy/fieldwork techniques. Demonstrate comprianch work.  Implete understanding and a good grasp of the s. Good critique and knowledge of relevant lite ntal approach to test research hypothesis echniques. Demonstrate effective, critical, asse te understanding and grasp of the subject ma outcomes. Acceptable critique and knowledge of experimental approach to test research hypothesis.	ehensive, critical, assessment of resident subject matter as demonstrated by atterature and identification of research hyp. Show good organizational and/or sessment of results and good presentation as demonstrated by general but incomplete or the statement of relevant literature and identification conthesis. Show fair organizational and/organizational a	ainment of the majori pothesis. Appropriate analytical skills and on of research work. complete attainment of fresearch hypothesi or analytical skills an	
	research work.  Evidence of limited understanding and grasp of the subject matter as demonstrated by incomplete attainment of many of the learning outcomes. Limited critique and knowledge of relevant literature and identification of research hypothesis. Poorly designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate confused and poorly organized assessment of results and limited presentation of					
	Fail	attained. Poor critic experimental approa	inadequate understanding and grasp of the signer and knowledge of relevant literature as to to test research hypothesis. Show little evictechniques. Demonstrate incorrect interpretations	and identification of research hypothed dence of appropriate organizational and	esis. Badly designed or analytical skills ar	
Course Type	Project-b	ased course				
ourse Teaching	Activitie		Details		No. of Hours	
Learning Activities	Reading	/ Self study	formal lectures, seminars & pr		144	
ssessment Methods nd Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin	
	Dissertat	tion		80	CLO 1,2,3,4,5,6,7,8	
	Oral pres	sentation	research seminar	20	CLO 5,7	
ourse Website		odle.hku.hk/				
Additional Course			0 - 12,000 words (80% weighting) an	d a research seminar (20% weigh	ghting).	
nformation	As BIOL4	4992 "FNS project	is a whole year course, students sh d in the 1st Semester only.			

BIOL4993	Molecu	ılar biology & biotechnology project (12 credits)	Academic Year	2017			
Offering Department	Biologica	al Sciences	Quota				
Course Co-ordinator	Dr W K	Dr W K Yip, Biological Sciences (wkyip@hku.hk)					
Teachers Involved	(All acad	(All academic staff in Molecular Biology & Biotechnology Major, Biological Sciences)					
Course Objectives	integrate	To provide a stimulating capstone experience for all Molecular Biology & Biotechnology Major undergraduates to integrate and apply their knowledge and skills obtained from the Molecular Biology & Biotechnology Major through planning and carrying out a research project under the supervision of a member of staff.					
Course Contents & Topics	course is	Students should seek approval from a prospective supervisor prior to selecting this course. After admission to the course is approved by the course coordinator, students will complete their project work under the guidance of their supervisor.					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 critique and review appropriate scientific literature						
	CLO 2 use this information to generate a scientifically relevant research question						
	CLO 3	CLO 3 develop and formulate scientific hypotheses to test this question					
	CLO 4	CLO 4 design and undertake practical research work to formally test the hypotheses proposed					
	CLO 5	analyse and evaluate the data collected to test the hypotheses					
	CLO 6	CLO 6 present data in a professional manner to illustrate the outcomes					
	CLO 7	draw an objective series of conclusions based on the experimental v	vork				
	CLO 8 highlight and discuss their research findings and place them into a holistic scientific context						

Pre-requisites (and Co-requisites and Impermissible combinations)	Biotechno Cumulativ This caps	ology Major; and re GPA of 3.0 or above. tone course is for Moleci	ular Biology & Biotechnology		Molecular Biology &
			red to take this capstone coul		
Offer in 2017 - 2018		ar long Offer in 2018 - :		Examination	No Exam
Grade Descriptors (A+ to F)	A	attainment of all learning of hypothesis. Well designed of skills and laboratory/fieldw presentation of research wor	outcomes. Excellent critique and kexperimental approach to test resear ork techniques. Demonstrate com rk.	a thorough grasp of the subject matt knowledge of relevant literature and ic arch hypothesis. Show excellent organiz- prehensive, critical, assessment of re-	dentification of research zational and/or analytical esults and professional
	В	of learning outcomes. Good designed experimental ap	critique and knowledge of relevant proach to test research hypothe	the subject matter as demonstrated by a literature and identification of research I sis. Show good organizational and/c assessment of results and good presenta	nypothesis. Appropriately or analytical skills and
	Evidence of adequate understanding and grasp of the subject matter as demonstrated by general but incomplete attainment of most of the learning outcomes. Acceptable critique and knowledge of relevant literature and identification of research hypothesis. Adequately designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate adequate but not necessarily critical, assessment of results and presentation of research work.				
	Evidence of limited understanding and grasp of the subject matter as demonstrated by incomplete attainment of many of the learning outcomes. Limited critique and knowledge of relevant literature and identification of research hypothesis. Poorly designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate confused and poorly organized assessment of results and limited presentation of research work.				
	Fail  Evidence of poor or inadequate understanding and grasp of the subject matter such that most of the learning outcomes are not attained. Poor critique and knowledge of relevant literature and identification of research hypothesis. Badly designed experimental approach to test research hypothesis. Show little evidence of appropriate organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate incorrect interpretation and assessment of results and poor presentation of research work.				
Course Type	Project-ba	ised course			
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Reading	Self study	formal lectures, seminars & practical work		144
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Dissertati			80	CLO 1,2,3,4,5,6,7,8
	Oral pres	entation	research seminar	20	CLO 1,6,7,8
Course Website	http://mod	dle.hku.hk/			
Additional Course Information	A disserta	tion of about 9,000 - 12,	000 words (80% weighting) a	and a research seminar (20% we	eighting).

BIOL4994	Biologic	cal sciences project (12 credits)	Aca	demic Year	2017	
Offering Department	Biological	Sciences	Quo	ota		
Course Co-ordinator	Prof W W	M Lee, Biological Sciences (hrszlwm@hku.hk)				
Teachers Involved	(All acade	mic staff in Biological Sciences Major, Biological Scie	nces)			
Course Objectives	apply thei	e a stimulating capstone experience for all Biologic r knowledge and skills obtained from the Biological project under the supervision of a member of staff.				
Course Contents & Topics		should seek approval from a prospective supervisor approved by the course coordinator, students will co r.				
Course Learning	On succes	ssful completion of this course, students should be all	ole to:			
Outcomes	CLO 1	critique and review appropriate scientific literature				
	CLO 2 ι	use this information to generate a scientifically relevan	nt research question			
	CLO 3	develop and formulate scientific hypotheses to test thi	s question			
	CLO 4	design and undertake practical research work to form	ally test the hypothese	es proposed		
	CLO 5	analyse and evaluate the data collected to test the hy	potheses			
	CLO 6	present data in a professional manner to illustrate the	outcomes			
	CLO 7 draw an objective series of conclusions based on the experimental work					
	CLO 8 highlight and discuss their research findings and place them into a holistic scientific context					
and Impermissible combinations)	This caps	re GPA of 3.0 or above. tone course is for Biological Sciences Major students est that a student is allowed to take this capstone cou		٧.		
Offer in 2017 - 2018		ar long Offer in 2018 - 2019 : Y		mination	No Exam	
Grade Descriptors (A+ to F)	A	Evidence of complete or near-complete understanding and attainment of all learning outcomes. Excellent critique and hypothesis. Well designed experimental approach to test reservished and laboratory/fieldwork techniques. Demonstrate compresentation of research work.	a thorough grasp of the s knowledge of relevant liter arch hypothesis. Show exce	subject matter a ature and ident ellent organization	as demonstrated by ification of research and/or analytical	
	B Evidence of near-complete understanding and a good grasp of the subject matter as demonstrated by attainment of the majority of learning outcomes. Good critique and knowledge of relevant literature and identification of research hypothesis. Appropriately designed experimental approach to test research hypothesis. Show good organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate effective, critical, assessment of results and good presentation of research work.					
	С	Evidence of adequate understanding and grasp of the subject matter as demonstrated by general but incomplete attainment or most of the learning outcomes. Acceptable critique and knowledge of relevant literature and identification of research hypothesis Adequately designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate adequate but not necessarily critical, assessment of results and presentation of research work.				
		research work.				
	D	research work.  Evidence of limited understanding and grasp of the subject mearning outcomes. Limited critique and knowledge of relevatesigned experimental approach to test research hypothelaboratory/fieldwork techniques. Demonstrate confused and poresearch work.	int literature and identifica esis. Show fair organizat	tion of research	n hypothesis. Poorly nalytical skills and	

	experimental appro	tique and knowledge of relevant literature bach to test research hypothesis. Show little e c techniques. Demonstrate incorrect interpr	evidence of appropriate organizational a	nd/or analytical skills and
Course Type	Project-based course			
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Reading / Self study	formal lectures, seminars & practical work		144
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Dissertation		80	CLO 1,2,3,4,5,6,7,8
	Oral presentation	research seminar	20	CLO 1,2,3,4,5,6,7,8
Course Website	http://moodle.hku.hk/			
Additional Course Information	A dissertation of about 9,00	00 - 12,000 words (80% weighting) a	and a research seminar (20% we	eighting).

ENIVO4204	Emiliar :	amantal life z -!	anaa (C aradita)	Anadamia Va	2017	
ENVS1301		nmental life scie	ence (6 credits)	Academic Ye		
Offering Department		I Sciences		Quota	60	
Course Co-ordinator			Il Sciences (rajan@hku.hk)			
Teachers Involved	-	ngatesen,Biologica	,			
Course Objectives	and impo biological evaluatio	This course intended for students who wish to understand the fundamentals of environmental biology/life science and importantly the relationship (connection) between environment and life. Here you will learn about the various piological/ecological principles and concepts of environmental science which are needed for critical discussion and evaluation of current global environmental issues including human ecology, urbanization, ecological economics and climate change.				
Course Contents			on of lectures, group discussion/debate	and field trips cum tutorials	We first explore the	
& Topics	fundamer life at varurbanizat students that hum students	fundamental interactions between organisms and their environment. We then explore environmental constraints on life at various ecosystems (like marine, freshwater, and terrestrial). Students will also learn how factors such as urbanization, climate change, and anthropogenic impacts affect life at population and ecosystem levels. Similarly, students will be exposed to the incredible interrelationships that are basic to ecological principles and the impact that human development has upon these interrelationships. After learning basics of environmental life science, students will be stimulated to think about current life science issues such as biodiversity loss, organisms adaptation to climate change, tragedy of commons (human ecology) and applied life science topics such as biomaterial science.				
Course Learning		essful completion c	of this course, students should be able t	:o:		
Outcomes		•	vironment and their interactions			
-			and ecosystem responses to human-in	duced environmental change	e	
		• • • • • • • • • • • • • • • • • • • •	cally think and discuss about current en			
			quipped: to tackle biological environme		to choose advanced	
		environmental scier		and describe described		
Pre-requisites	NIL					
(and Co-requisites and Impermissible combinations)						
Offer in 2017 - 2018	Y 2n	d sem Offer in 20	018 - 2019 : Y	Examination	May	
Grade Descriptors	Α	Evidence of original	I thought during the analysis of environmental I	ife science issues. Show evidence		
	B C D	environmental life so Show substantial kn analytical, critical ar course learning out real environmental li Show general but i knowledge and skill learned in the class presentational and f Evidence to show a life science issues. poor ability to apply very little organizatic Evidence of meage knowledge and skill	all thinking about the study subject. Extensive knowledge and skills required for attaining all the course I nonstrate excellent ability to apply what you have learned in the class room to critically analyze the science issues. Show highly effective organizational, presentational and field trip skills. The skills was all knowledge and thought during the analysis of environmental life science issues. Show some evidence all and multidimensional thinking about the study subject. Good knowledge and skills required for attaining outcomes. Demonstrate good ability to apply what you have learned in the class room to critically analyte incomplete knowledge and original thought during the analysis of environmental life science issues skills required for attaining all the course learning outcomes. Demonstrate fair ability to apply what you have learned to critically analyze the real environmental life science issues. Show considerable organize and field trip skills.  The symmetry of the science issues is the subject of the science issues. Show considerable organizes and field trip skills.  The symmetry of the science issues is the subject of the science issues. Show considerable organizes and sills required for attaining all the course learning outcomes. Demonstrate the science issues is the science issues. Show no evidence or inadequate knowledge and understanding of environmental life science issues. Show no evidence or inadequate knowledge and understanding of environmental life science issues. Show no evidence or inadequate knowledge and understanding of environmental life science issues. Show no evidence of familial science issues.			
			s room to critically analyze the real environmen		to apply what you have vidence of familiarity with	
Course Type	Lecture w	relevant reading ma	s room to critically analyze the real environment terial and field trip demonstrations, or any knowle		to apply what you have vidence of familiarity with	
		relevant reading ma with laboratory com	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowle onent course		to apply what you have vidence of familiarity with ational skills.	
Course Teaching	Activitie	relevant reading ma with laboratory com es	s room to critically analyze the real environment terial and field trip demonstrations, or any knowle		to apply what you have ridence of familiarity with ational skills.	
Course Teaching	Activitie Lectures	relevant reading ma with laboratory com es	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowledge of the course  Details		to apply what you have idence of familiarity with stional skills.  No. of Hours 24	
Course Teaching	Activitie Lectures Field wo	relevant reading ma with laboratory com es s rk	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowle onent course		to apply what you have ridence of familiarity with titional skills.  No. of Hours  24  12	
Course Teaching	Activitie Lectures Field wo Tutorials	relevant reading ma with laboratory com es s rk	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowledge of the course  Details		to apply what you have idence of familiarity with attional skills.  No. of Hours  24  12  12	
Course Teaching & Learning Activities	Activitie Lectures Field wor Tutorials Reading	relevant reading ma with laboratory com es s rk s / Self study	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowledge of the real environment course    Details   3-12 hours field work	edge of organizational and presenta	to apply what you have idence of familiarity with the idence of familiarity with the identity of the identity	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Field won Tutorials Reading Methods	relevant reading ma with laboratory com es s s rik s / Self study	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowledge of the course  Details	Weighting in final course grade (%)	to apply what you have idence of familiarity with stional skills.  No. of Hours  24  12  12  100  Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Field wor Tutorials Reading	relevant reading ma with laboratory com es s s rik s / Self study	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowledge of the real environment course    Details   3-12 hours field work	Weighting in final course grade (%)	to apply what you have idence of familiarity with stitional skills.  No. of Hours  24  12  12  100  Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Field won Tutorials Reading Methods	relevant reading ma with laboratory comes s s rk s // Self study s	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowledge of the real environment course    Details   3-12 hours field work	Weighting in final course grade (%)	to apply what you have idence of familiarity with stional skills.  No. of Hours  24  12  12  100  Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Field wor Tutorials Reading Methods	relevant reading ma with laboratory com es s s // Self study s nents ation	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowledge of the real environment course    Details   3-12 hours field work	Weighting in final course grade (%)	to apply what you have idence of familiarity with stitional skills.  No. of Hours  24  12  12  100  Assessment Methods to CLO Mapping CLO 2,3	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Field woi Tutorials Reading Methods  Assignm Examina Presenta	relevant reading ma with laboratory com es s s // Self study s nents ation	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowled the real environmenterial and field trip demonstrations, or any knowledge of the real environmenterial and field trip demonstrations, or any knowledge of the real environmenterial environmenteri	Weighting in final course grade (%)  10 70 10	to apply what you have vidence of familiarity with the third skills.  No. of Hours  24  12  12  100  Assessment Methods to CLO Mapping CLO 2,3  CLO 1,3  CLO 3,4	
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activitie Lectures Field won Tutorials Reading Methods  Assignm Examina Presenta Test	relevant reading ma with laboratory comes s s rk s / Self study s nents ation	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowled the real environmenterial and field trip demonstrations, or any knowledge of the real environmenterial and field trip demonstrations, or any knowledge of the real environmenterial environmenteri	Weighting in final course grade (%)  10 70 10 10 10	to apply what you have idence of familiarity with thional skills.  No. of Hours  24  12  100  Assessment Methods to CLO Mapping CLO 2,3 CLO 1,3	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended	Activitie Lectures Field won Tutorials Reading Methods  Assignm Examina Presenta Test Appropria	relevant reading ma with laboratory comes s s rk s / Self study s nents ation	s room to critically analyze the real environmenterial and field trip demonstrations, or any knowledge and field trip demonstrations, or any knowledge and the second seco	Weighting in final course grade (%)  10 70 10 10 10	to apply what you have vidence of familiarity with titional skills.  No. of Hours  24  12  12  100  Assessment Methods to CLO Mapping CLO 2,3  CLO 1,3  CLO 3,4	

Additional	Course
Informatio	n

This course will be offered subject to a minimum enrollment number and availability of teachers.

ENVS2001	Method	ls in environmer	ntal science (6 credits)	Academic Yo	ear 2017	
Offering Department	Biologica	l Sciences		Quota	42	
Course Co-ordinator	Dr D M E	Baker, Biological Sci	ences (dmbaker@hku.hk)			
Teachers Involved	(Dr D M I	Baker,Biological Sci	ences)			
Course Objectives	science. reporting	To introduce students to a broad spectrum of field and laboratory methods for data collection in environmental science. Through exposure to environmental data collection, experimental design, data analysis, interpretation and reporting, students will gain a deeper appreciation of the process that underlies environmental science research and it's relevancy to critical thinking and future careers in the sciences.				
Course Contents & Topics	This cou cover ba based ex the bios experien	This course will involve environmental data collection in both field and laboratory settings. In-class lectures will cover basic principles of specific methodologies and relevant applications in preparation for laboratory and field-based experiential learning. Having an interdisciplinary focus, the course will cover topics relevant to the study of the biosphere, encompassing terrestrial, aquatic, and atmospheric systems. Students will gain hands-on experience with the operation of standard and advanced sampling and analytical equipment, quality control, basic data analysis and reporting.				
Course Learning	On succe	essful completion of	this course, students should be a	ble to:		
Outcomes	CLO 1 u	inderstand how scie	ntific data is used to address envi	ronmental problems		
		nave a basic unders lata	standing of the techniques and me	ethodologies necessary for colle	ecting environmenta	
	CLO 3 u	inderstand some of	the problems inherent in data colle	ection, and how this impacts dat	a interpretation	
			a collected in the lab and field can			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL1309 or EASC1	1401 or ENVS1301 or ENVS1401			
Offer in 2017 - 2018	Y 1s	t sem Offer in 201	8 - 2019 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	Α	original thought. App and insightful conclus	th grasp of the subject. Show strong ana ly highly effective lab / fieldwork skills and sions. Apply highly effective organizational	d techniques. Critical use of data and real and presentational skills.	sults to draw appropriat	
		B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective lab / fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.				
		Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab / fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.				
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective lab / fieldwork skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab / fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.					
		techniques. Misuse of	I abilities, logical and coherent thinking. In fata and results and/or unable to draw a	Apply minimally effective or ineffective	lab / fieldwork skills and	
		techniques. Misuse of	I abilities, logical and coherent thinking. In fata and results and/or unable to draw a ineffective.	Apply minimally effective or ineffective	lab / fieldwork skills and	
Course Teaching		techniques. Misuse of minimally effective or ary and workshop co	I abilities, logical and coherent thinking. In fata and results and/or unable to draw a ineffective.	Apply minimally effective or ineffective	lab / fieldwork skills and	
Course Teaching	Laborato	techniques. Misuse of minimally effective or and workshop coes	I abilities, logical and coherent thinking. If data and results and/or unable to draw a ineffective. urse	Apply minimally effective or ineffective	lab / fieldwork skills and d presentational skills ar	
Course Teaching	Laborato	techniques. Misuse of minimally effective or ory and workshop co es	I abilities, logical and coherent thinking. If data and results and/or unable to draw a ineffective. urse	Apply minimally effective or ineffective	lab / fieldwork skills and presentational skills and No. of Hours	
Course Teaching	Laborato Activitie Laborato Field wo	techniques. Misuse of minimally effective or ory and workshop coes  ory ory ory ory ory ory ory ory ory	I abilities, logical and coherent thinking. If data and results and/or unable to draw a ineffective. urse	Apply minimally effective or ineffective	lab / fieldwork skills and presentational skills and presentational skills and No. of Hours  30 10 20	
Course Teaching	Laborato Activitie Laborato Field wo	techniques. Misuse of minimally effective or ory and workshop coes  ory ory ory ory ory ory ory ory ory	I abilities, logical and coherent thinking. If data and results and/or unable to draw a ineffective. urse	Apply minimally effective or ineffective	lab / fieldwork skills and presentational skills and presentational skills and No. of Hours  30  10  20  12	
Course Teaching	Laborato Activitie Laborato Field wo Project v Tutorials	techniques. Misuse of minimally effective or ory and workshop coes  ory ory ory ory ory ory ory ory ory	I abilities, logical and coherent thinking. If data and results and/or unable to draw a ineffective. urse	Apply minimally effective or ineffective	lab / fieldwork skills and presentational skills and presentational skills and No. of Hours  30 10 20	
Course Teaching & Learning Activities  Assessment Methods	Laborato Activitie Laborato Field wo Project v Tutorials	techniques. Misuse of minimally effective or viry and workshop coes  ory  rk  work  / Self study	I abilities, logical and coherent thinking. If data and results and/or unable to draw a ineffective. urse	Apply minimally effective or ineffective	No. of Hours 30 10 20 12 60 Assessment Methods	
Course Teaching & Learning Activities  Assessment Methods	Laborato Activitie Laborato Field wo Project v Tutorials Reading	techniques. Misuse of minimally effective or yand workshop coes ory ory ork work of the coes of the co	I abilities, logical and coherent thinking. If data and results and/or unable to draw a ineffective.  Urse  Details	Apply minimally effective or ineffective ppropriate conclusions. Organization an	No. of Hours 30 10 20 12 60 Assessment Methods	
Course Teaching & Learning Activities  Assessment Methods	Laborato Activitie Laborato Field wo Project v Tutorials Reading Methods	techniques. Misuse of minimally effective or yand workshop coes ory ory ork work of the coes of the co	I abilities, logical and coherent thinking. If data and results and/or unable to draw a ineffective.  Urse  Details	Apply minimally effective or ineffective ppropriate conclusions. Organization an Weighting in final course grade (%)	No. of Hours  No. of Hours  30  10  20  12  60  Assessment Methods to CLO Mapping	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Laborato Activitie Laborato Field wo Project v Tutorials Reading Methods	techniques. Misuse of minimally effective or ry and workshop coes or y and workshop coes or y and workshop coes or y and work of the coes	I abilities, logical and coherent thinking. If data and results and/or unable to draw a ineffective.  Urse  Details	Apply minimally effective or ineffective ppropriate conclusions. Organization an   Weighting in final course grade (%)	No. of Hours 30 10 20 12 60 Assessment Methods to CLO Mapping CLO 1,2,3	

ENVS2002	Enviro	nmental data analysis (6 credits)  Academic Year	2017			
Offering Department	Biologica	al Sciences Quota	65			
Course Co-ordinator	Dr T C B	Bonebrake, Biological Sciences (tbone@hku.hk)				
Teachers Involved						
Course Objectives	environm environm approach	de students with the ability to analyze data; especially data which are relevant to issue nental science. This course will enable students to accurately interpret, organize, display nental data. The course will also introduce students to principles of a variety of im hes in analyzing environmental data including spatial analysis, geographic information risk assessment, and time series analysis.	/, test and analyze portant advanced			
Course Contents & Topics	testing in most enviro in enviro in a com	The course will feature lectures on aspects of sampling, distributions, uncertainty, probability, and hypothesis testing in addition to lectures on advanced analysis topics. Special emphasis will be placed on qualities inherent to most environmental datasets such as large size, multivariate, and spatial. All material will be applied and practiced in environmental science contexts (e.g. chemistry, ecology, geology and oceanography) using a variety of datasets in a computer laboratory setting using the 'R Project for Statistical Computing' software (a graphical user interface will be implemented such that prior knowledge of coding or computer science is not required).				
Course Learning	On succe	essful completion of this course, students should be able to:				
Outcomes	CLO 1	accurately interpret methods and approaches in the scientific literature				
	CLO 2	CLO 2 evaluate critically data analyses in the environmental sciences				
	CLO 3	perform standard and appropriate statistical analyses on a variety of data sources				
	CLO 4 work comfortably with large datasets using applied software (e.g. R)					

Pre-requisites	Pass in Bl	IOL1309 or EASC14	101 or ENVS1301 or ENVS1401			
(and Co-requisites and Impermissible combinations)						
Offer in 2017 - 2018	Y 2nd	sem Offer in 201	8 - 2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply a highly effective computational skills and techniques for basic statistical analyses. Be able to critically use data and statistical results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial grasp of the subject and skills required for attaining at least most of the course learning outcomes. Present evidence of analytical and critical abilities and logical thinking. Apply effective computational skills and techniques for basic statistical analyses. Be able to correctly use data and statistical results to draw appropriate conclusions. Apply effective organizational and presentational skills.				
	С	Present evidence of so techniques for basic s	out incomplete grasp of the subject and skills out analytical and critical abilities and logical tatistical analyses. Demonstrate mostly corre lusions. Apply moderately effective organization	thinking. Apply moderately effective ect but some erroneous use of data	computational skills and	
	D	Present evidence of so limited or barely effect	nd limited grasp of the subject and skills re- ome analytical and critical abilities and logical tive computational skills and techniques for I sults to draw appropriate conclusions. Apply	thinking, but with limited analytical abasic statistical analyses. Demonst	and critical abilities. Apply rate limited ability to use	
	Fail	evidence of little or la computational skills a unable to draw approp	r no grasp of the subject and skills required ck of analytical and critical abilities, logical or nd techniques for basic statistical analyses. riate conclusions. Apply minimally effective or	or coherent thinking. Apply minimal Demonstrate misuse of data and	ly effective or ineffective statistical results and/or	
Course Type		ith laboratory compo	onent course			
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laborator	<b>-</b> y	problem-based learning/compu	24		
	Tutorials			6		
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examinat	ion		25	CLO 1,2,3	
	Project re	port		25	CLO 1,2,3,4,5	
	Test		problem-based exercises	50	CLO 1,2,3,4,5	
Required/recommended reading and online materials	Shahbaba Reimann, Sons, Chi	extbooks: hahbaba, B. 2012. Biostatistics with R: An Introduction to Statistics through Biological Data. Springer, New York. leimann, C. et al. 2007. Statistical Data Analysis Explained: Applied Environmental Statistics with R. John Wiley & ons, Chichester.				
	Zhang C.	2007. Fundamental	s of Environmental Sampling and An	alysis. John Wiley & Sons, N	ew Jersey.	
Course Website		v.biosch.hku.hk/eco				

	Urban ed	cology (6 credits)		Academic Year	2017	
Offering Department	Biological	Sciences		Quota	75	
Course Co-ordinator	Dr T C Boi	nebrake, Biological Sciences (tbone@hku.hk)				
Teachers Involved						
Course Objectives	This course will provide students with an understanding and knowledge of the ecology of urban ecosystems. The course will highlight the role of cities in a world under environmental change and rapid development.					
Course Contents & Topics	Ecological systems within cities and cities as ecological systems will both be covered in this course. Ecological concepts unique to or specialized within cities will be covered including sustainability, conservation, health, development, globalization, and restoration. Specific topics will include climate change (e.g. urban heat island effects), invasive species, infectious diseases and pollution. Examples will be taken globally but special emphasis will be placed on Hong Kong.					
Course Learning	On succes	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 de	scribe and evaluate the processes and patterns	s that characterize urba	n ecological syste	ems	
	CLO 2 un	derstand biodiversity and ecosystem responses	s to urbanization			
		cognize energy flows within urban ecosystems vironmental quality	s and how energy use	and waste impro	ve or deteriorate	
	CLO 4 cri	tically evaluate management and policy solution	ns to urban ecological p	oroblems		
D	D :- DI	OL 0000 ENIVODO04 ENIVODO00				
(and Co-requisites and Impermissible	Pass in Bl	OL2306 or ENVS2001 or ENVS2002				
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2017 - 2018		OL2306 or ENVS2001 or ENVS2002  sem Offer in 2018 - 2019 : N		Examination	Dec	
(and Co-requisites and Impermissible combinations)		sem Offer in 2018 - 2019 : N  Demonstrate thorough mastery at an advanced level of outcomes. Show strong analytical and critical abilities ar and synthesize information, and ability to apply knowled highly effective presentational skills. Strong evidence of c	nd logical thinking, with evide ge to a wide range of comple lear attention to thoughtful ar	Ils required for attaining ence of original though ex, familiar and unfamind reflective thinking.	ng all course learning ht, ability to integrate niliar situations. Apply	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st	sem Offer in 2018 - 2019 : N  Demonstrate thorough mastery at an advanced level of outcomes. Show strong analytical and critical abilities are and synthesize information, and ability to apply knowled.	nd logical thinking, with evide ge to a wide range of comple lear attention to thoughtful ar knowledge and skills require tical abilities and logical thin	Ills required for attaining ence of original though ex, familiar and unfamind reflective thinking. It for attaining at least king, integration of me.	ng all course learning ht, ability to integrate hillar situations. Apply at most of the course aterials and ability to	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st	Sem Offer in 2018 - 2019 : N  Demonstrate thorough mastery at an advanced level of outcomes. Show strong analytical and critical abilities an and synthesize information, and ability to apply knowledhighly effective presentational skills. Strong evidence of componstrate substantial command of a broad range of learning outcomes. Show evidence of analytical and critiapply knowledge to familiar and some unfamiliar situe.	nd logical thinking, with evide ge to a wide range of comple lear attention to thoughtful ar knowledge and skills require tical abilities and logical thin ations. Demonstrate effective wledge and skills required al abilities and logical thinkin	Ils required for attaining the common of original though the common of original though the common of original the common original through the common origi	ng all course learning ht, ability to integrate hilliar situations. Apply at most of the course aterials and ability to s. Evidence of clear the course learning y knowledge to most	

		cal abilities, logical and coherent thinking. She n and presentational skills are minimally effective		apply knowledge to solve		
Course Type	Lecture-based course	Lecture-based course				
Course Teaching & Learning Activities	Activities	Details		No. of Hours		
	Lectures			36		
	Tutorials			12		
	Reading / Self study			100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination	Mid-term exam (20%), Final exam (30%)	50	CLO 1,2,3,4		
	Presentation		20	CLO 1,2,3,4		
	Project reports		30	CLO 1,2,3,4		
Required/recommended reading and online materials	and Applications. Oxford Univ	ivist T, Guntenspergen PJ, McIntyre N versity Press, Oxford. ogy. Cambridge University Press, Cam	. , , ,	: Patterns, Processes		
Course Website	http://www.biosch.hku.hk/eco	logy/lsc/	-			
Additional Course Information	This course will be offered su Offer in alternative year from	bject to a minimum enrollment number 2013-2014	and availability of teache	ers.		

ENVS3020	Global	change ecology	(6 credits)	Academic Ye	ar 2017	
Offering Department		al Sciences	·	Quota	65	
Course Co-ordinator	Dr C Din	ngle, Biological Scier	nces (cdingle@hku.hk)			
eachers Involved						
Course Objectives	biodivers	sity from organisms balization have ma	to ecosystems. This course will e	e ways in which global environme explore the contributions that huma e gases and associated climate s on biological systems.	an population growt	
Course Contents & Topics	Environr disappea natural v focus pr topics re synergis how it is use cha investiga organism	Environmental change is a natural phenomenon, with ecosystems continually shifting, rearranging, emerging, and disappearing through geologic time with changes in climatic conditions. The activities of humans have added to this natural variation, increasing the magnitude and speed with which environmental change occurs. This course will focus principally on the effects of climate change on organisms and ecosystems but will also investigate other topics registering on a global scale including land use change, biological invasions, and pollution, as well as synergistic interactions between all of the environmental stressors. We will explore (1) what climate change is and how it is manifested including climate warming, sea level rise, and ocean acidification; (2) types and extents of land use change; (3) how globalization has contributed to the spread of alien species and disease. The course will investigate how these human-caused stressors affect the morphology, phenology, distribution, and evolution of organisms and their impacts on ecosystem functioning and biodiversity in freshwater, marine, and terrestrial ecosystems.				
Course Learning	On succ	essful completion of	this course, students should be a	able to:		
Outcomes	CLO 2	change, and how the explain the ways th	ey are manifested on a global sca	d other human-associated impact ale sms' traits and distributions, and		
	ecosystem level					
	CLO 3 understand the differences between climate change on a geologic time scale and recent climate change					
		be aware of the relat BIOL2306 or ENVS2	tionships between humans and gl	lobal change		
Pre-requisites and Co-requisites and Impermissible combinations)	1 433 111	DIOLESSO OF LINVOZ	EUOT OF LINVOZUUZ			
Offer in 2017 - 2018	N O	offer in 2018 - 2019 :	Υ	Examination		
Grade Descriptors (A+ to F)	A	Demonstrate thoroug outcomes. Show stro and synthesize inforr	th mastery at an advanced level of exten ong analytical and critical abilities and log mation, and ability to apply knowledge to	sive knowledge and skills required for attr gical thinking, with evidence of original th a wide range of complex, familiar and ur attention to thoughtful and reflective thinkir	ought, ability to integrat familiar situations. Appl	
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking.				
	С					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking.					
	Fail	of analytical and cri	no evidence of command of knowledge a tical abilities, logical and coherent think on and presentational skills are minimally	and skills required for attaining the course king. Show very little or no ability to ap effective or ineffective.	learning outcomes. Lac ply knowledge to solve	
Course Type	Lecture-	based course				
Course Teaching	Activitie	es	Details		No. of Hours	
Learning Activities	Lectures				24	
	Tutorials				12	
	Project		Problem-based exercises		20	
		g / Self study			100	
Assessment Methods and Weighting	Method	Is	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin	

	Assignments	problem-based exercises (10%), continuous assessment (10%)	20	CLO 1,2,3,4
	Essay	Essay and presentation	30	CLO 1,2
	Examination		30	CLO 1,2,3,4
	Test	Mid-term test	20	CLO 1,2,3,4
Required/recommended reading and online materials	Lovejoy, T.E. and Hannah, L. 2009 Newman et al. 2011. Climate Char Required articles: Araujo, M.B., and Rahbek, C. 2009 Grimm, N.B., Faeth, S.H., Golubic and the ecology of cities. Science Schlesinger, W.H. 2006. Global ch	5. Climate Change and Biodiversity. \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	odiversity? Science 313:1: ni, X., and Briggs, J.M. 200	396-1397.
Course Website	http://moodle.hku.hk/		d	
Additional Course Information	This course will be offered subject	to a minimum enrollment number an	d availability of teachers.	

ENVS4110	Enviror	nmental remediatio	n (6 credits)	Academic Ye	ar 2017	
Offering Department		l Sciences		Quota	30	
Course Co-ordinator	Dr J D G	u, Biological Sciences (	(jdgu@hku.hk)			
eachers Involved	(Dr J D G	Bu,Biological Sciences)				
Course Objectives	environm To under character To learn	To introduce students with the environmental fate information of different pollutants/contaminants in the environment  To understand the technologies available for environmental remediation of pollutants in soils and water, and the characteristics of each techniques relevant to the pollutants of concern  To learn the fundamental physical, chemical and biochemical reactions involved in the remediation process  To obtain skills for critical analysis of the recent technological development and the proposed applications				
Couras Contents			9		• •	
Course Contents & Topics	aquatic; a phytorem biphenols the speci transport	Understanding the types of different pollutants and their fate in the environments including both terrestrial and aquatic; and relevant strategy of pollution control and treatment; advanced oxidation, microbiological treatment and phytoremediation; mechanisms of biochemical transformation of polyaromatic hydrocarbon, polychlorinated biphenols, agrichemicals and phthalate esters as well as both metals and metalloids; biochemical pathways and the specific genes involved in detoxification; chemotaxis and engineering the degradation pathways in bacteria; transport of microorganisms and monitoring in subsurface environment; survival of introduced organisms; evolution of the degradative genes in bacteria; in situ and ex situ remediation techniques; green technologies.				
Course Learning	On succe	essful completion of this	s course, students should be ab	le to:	•	
Outcomes	CLO 1 e	explain the remediation	technologies available to the type	be of pollutants of concern in rea	mediation practice	
		ropose remediation strain pollutants and the cos	ategies for polluted sites with the	ne best technologies available of	considering the typ	
		•	ogies available for the specific	pollutants and the fundamental	process involved i	
		erms of the catalysts an			process involves i	
	CLO 4 d	lescribe several key o	chemical and biochemical pro formation on their history and d		I remediation with	
Pre-requisites			or BIOL3401 or ENVS3042	evelopment		
and Co-requisites and Impermissible combinations)	1 433 111 2	SIGLOTION OF BIOLOTTO	or Brocond'r or Envious-2			
Offer in 2017 - 2018	Y 2n	d sem Offer in 2018 -	2019 · N	Examination	May	
Grade Descriptors	Α		advanced level of extensive knowledge			
(A+ to F)						
(2. 61)	B C	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gra lab skills and techniques presentational skills. General but incomplete c but incomplete grasp of effective lab skills and tec Apply moderately effective Partial but limited comma	phy effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skilasp of the subject. Show evidence of ail. Correct use of data of results to drawmand of knowledge and skills require the subject. Evidence of some analytichniques. Mostly correct but some erro organizational and presentational skill and of knowledge and skills required for the subject.	unal skills.  Ills required for attaining at least most analytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course lead and critical abilities and logical thineous use of data and results to draw s.  or attaining some of the course learning and the course learning some of the course learning the course learning some of the course learning the	appropriate and insight t of the course learnin I thinking. Apply effective inctive organizational ar rning outcomes. Gener nking. Apply moderate appropriate conclusion ong outcomes. Partial b	
(4. 61)	С	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gra lab skills and techniques presentational skills. General but incomplete c but incomplete grasp of effective lab skills and tec Apply moderately effective Partial but limited comma limited grasp, with retentic	phy effective lab skills and techniques. I effective organizational and presentatic as broad range of knowledge and skilasp of the subject. Show evidence of ai . Correct use of data of results to drawmand of knowledge and skills requisit the subject. Evidence of some analytichniques. Mostly correct but some erro e organizational and presentational skill and of knowledge and skills required from of some relevant information, of the semination of some relevant information, of the seminations are seminational skills of knowledge and skills required from of some relevant information, of the seminations are seminational skills.	Critical use of data and results to draw a shall skills. Ills required for attaining at least most nalytical and critical abilities and logical aw appropriate conclusions. Apply effected for attaining most of the course least and critical abilities and logical thin neous use of data and results to draw so or attaining some of the course learning subject. Evidence of some coherent and	appropriate and insight t of the course learnir I thinking. Apply effectivictive organizational ar rming outcomes. General nking. Apply moderate appropriate conclusion of outcomes. Partial b togical thinking, but w	
	С	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete created but incomplete grasp of effective lab skills and techniques presentational skills. General but limited comma limited grasp, with retentic limited analytical and critiappropriate conclusions. A Little or no evidence of cron or grasp of the knowle and coherent thinking. Mi	phy effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skilasp of the subject. Show evidence of ail. Correct use of data of results to drawmand of knowledge and skills require the subject. Evidence of some analytichniques. Mostly correct but some erro organizational and presentational skill and of knowledge and skills required for the subject.	Critical use of data and results to draw a mal skills. Ils required for attaining at least most nalytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s. or attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attional and presentational skills. ed for attaining the course learning out Evidence of little or lack of analytical ars and techniques. Misuse of data and	appropriate and insight to f the course learnin I thinking. Apply effectivitive organizational arrning outcomes. Generiking. Apply moderate appropriate conclusion on goutcomes. Partial bil logical thinking, but will date and results to dratic described by the comes. Evidence of litting the comes. Evidence of litting and/or unable results and/or unable	
	C D Fail	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete created but incomplete grasp of effective lab skills and techniques presentational skills. General but limited comma limited grasp, with retentic limited analytical and critiappropriate conclusions. A Little or no evidence of cron or grasp of the knowle and coherent thinking. Mi	phly effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skilasp of the subject. Show evidence of an a Correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytichniques. Mostly correct but some errore organizational and presentational skills and of knowledge and skills required from of some relevant information, of the soal abilities. Partially effective lab skills Apply limited or barely effective organizationand of knowledge and skills required and understanding of the subject inimally effective or ineffective lab skills ons. Organization and presentational slights.	Critical use of data and results to draw a mal skills. Ils required for attaining at least most nalytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s. or attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attional and presentational skills. ed for attaining the course learning out Evidence of little or lack of analytical ars and techniques. Misuse of data and	appropriate and insight t of the course learnin I thinking. Apply effective organizational an rning outcomes. Gener nking. Apply moderate appropriate conclusion ng outcomes. Partial bi d logical thinking, but wi data and results to dra tictomes. Evidence of litt ind critical abilities, logic results and/or unable i	
Course Type	C D Fail	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete country in the command of effective lab skills and techniques presentational skills.  General but incomplete confective lab skills and techniques of effective lab skills and techniques of the command in the command of the co	phly effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skilasp of the subject. Show evidence of an a Correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytichniques. Mostly correct but some errore organizational and presentational skills and of knowledge and skills required from of some relevant information, of the soal abilities. Partially effective lab skills Apply limited or barely effective organizationand of knowledge and skills required and understanding of the subject inimally effective or ineffective lab skills ons. Organization and presentational slights.	Critical use of data and results to draw a mal skills. Ils required for attaining at least most nalytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s. or attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attional and presentational skills. ed for attaining the course learning out Evidence of little or lack of analytical ars and techniques. Misuse of data and	appropriate and insight to f the course learnin I thinking. Apply effectivitive organizational arrning outcomes. Generiking. Apply moderate appropriate conclusion on goutcomes. Partial bil logical thinking, but will date and results to dratic described by the comes. Evidence of litting the comes. Evidence of litting and/or unable results and/or unable	
Course Type Course Teaching	C D Fail Lecture w	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete count incomplete grasp of effective lab skills and techniques provided by moderately effective. Partial but limited comma limited grasp, with retentic limited analytical and critic appropriate conclusions. Little or no evidence of corno grasp of the knowled and coherent thinking. Midraw appropriate conclusivith laboratory componers.	phly effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skil asp of the subject. Show evidence of an a Correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytic thindives. Mostly correct but some errore organizational and presentational skills required from of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational and of knowledge and skills required from the subject of the subject inimally effective or ineffective lab skills ons. Organization and presentational slent course	Critical use of data and results to draw a mal skills. Ils required for attaining at least most nalytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s. or attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attional and presentational skills. ed for attaining the course learning out Evidence of little or lack of analytical ars and techniques. Misuse of data and	appropriate and insight t of the course learnin I thinking. Apply effective organizational ar rning outcomes. Gener nking. Apply moderate appropriate conclusion ng outcomes. Partial b I logical thinking, but wi data and results to dra tecomes. Evidence of litt and critical abilities, logic results and/or unable e.  No. of Hours	
Course Type Course Teaching	C D Fail Lecture w Activitie Lectures	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete croud incomplete grasp of effective lab skills and techniques properties and skills. Partial but limited grasp, with retentic limited grasp, with retentic limited analytical and critic appropriate conclusions. Little or no evidence of corno grasp of the knowled and coherent thinking. Midraw appropriate conclusivith laboratory componeds.	phly effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skil asp of the subject. Show evidence of an a Correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytic thindives. Mostly correct but some errore organizational and presentational skills required from of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational and of knowledge and skills required from the subject of the subject inimally effective or ineffective lab skills ons. Organization and presentational slent course	Critical use of data and results to draw a mal skills. Ils required for attaining at least most nalytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s. or attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attional and presentational skills. ed for attaining the course learning out Evidence of little or lack of analytical ars and techniques. Misuse of data and	appropriate and insight t of the course learnin I thinking. Apply effective organizational ar rning outcomes. Gener nking. Apply moderate appropriate conclusion ng outcomes. Partial b I logical thinking, but wi data and results to dra tcomes. Evidence of litth of critical abilities, logic results and/or unable e.	
Course Type Course Teaching	C D Fail Lecture w Activitie Lectures Laborato	original thought. Apply hig conclusions. Apply highly conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete or but incomplete grasp of effective lab skills and technique laborated by the service of the service of conclusions. A Little or no evidence of conclusions or grasp of the knowle and coherent thinking. Midraw appropriate conclusions with laboratory componers.	phly effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skil asp of the subject. Show evidence of an a Correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytic thindives. Mostly correct but some errore organizational and presentational skills required from of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational and of knowledge and skills required from the subject of the subject inimally effective or ineffective lab skills ons. Organization and presentational slent course	Critical use of data and results to draw a mal skills. Ils required for attaining at least most nalytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s. or attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attional and presentational skills. ed for attaining the course learning out Evidence of little or lack of analytical ars and techniques. Misuse of data and	appropriate and insight t of the course learnin I thinking. Apply effective troise organizational ar rring outcomes. Gener nking. Apply moderate appropriate conclusion ng outcomes. Partial b d logical thinking, but wi data and results to dra tocomes. Evidence of litt d critical abilities, logic results and/or unable e.  No. of Hours 24 8	
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Course Type Course Teaching	C D Lecture w Activitie Lectures Laborato Field woo	original thought. Apply hig conclusions. Apply highly conclusions. Apply highly Substantial command of outcomes. Substantial gral lab skills and techniques presentational skills.  General but incomplete or but incomplete grasp of effective lab skills and tec Apply moderately effective Partial but limited comma limited grasp, with retentic limited analytical and criti appropriate conclusions. Little or no evidence of corno grasp of the knowle and coherent thinking. Midraw appropriate conclusivith laboratory componers.	phly effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skil asp of the subject. Show evidence of an a Correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytic thindives. Mostly correct but some errore organizational and presentational skills required from of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational and of knowledge and skills required from the subject of the subject inimally effective or ineffective lab skills ons. Organization and presentational slent course	Critical use of data and results to draw a mal skills. Ils required for attaining at least most nalytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s. or attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attional and presentational skills. ed for attaining the course learning out Evidence of little or lack of analytical ars and techniques. Misuse of data and	appropriate and insight t of the course learnin I thinking. Apply effective trive organizational an rning outcomes. Gener nking. Apply moderate appropriate conclusion ng outcomes. Partial bi d logical thinking, but wi data and results to dra tecomes. Evidence of litt d critical abilities, logic results and/or unable is e.  No. of Hours 24 8	
Course Type Course Teaching	C D Fail Lecture w Activitie Lectures Laborato Field wo Project w Tutorials	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete or but incomplete grasp of effective lab skills and tec Apply moderately effective Partial but limited comma limited grasp, with retentic limited analytical and criti appropriate conclusions. A Little or no evidence of corn or grasp of the knowle and coherent thinking. Midraw appropriate conclusivith laboratory components.	phly effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skil asp of the subject. Show evidence of an a Correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytic thindives. Mostly correct but some errore organizational and presentational skills required from of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational and of knowledge and skills required from the subject of the subject inimally effective or ineffective lab skills ons. Organization and presentational slent course	Critical use of data and results to draw a mal skills. Ils required for attaining at least most nalytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s. or attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attional and presentational skills. ed for attaining the course learning out Evidence of little or lack of analytical ars and techniques. Misuse of data and	appropriate and insight t of the course learnin I thinking. Apply effective organizational ar rning outcomes. Gener nking. Apply moderate appropriate conclusion ng outcomes. Partial b d logical thinking, but wi data and results to dra comes. Evidence of litt and critical abilities, logic results and/or unable b.  No. of Hours 24 8 6 6 6 6	
Course Type Course Teaching & Learning Activities  Assessment Methods	C D Fail Lecture w Activitie Lectures Laborato Field wo Project w Tutorials	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete or but incomplete grasp of effective lab skills and tec Apply moderately effective Partial but limited comma limited grasp, with retentic limited analytical and criti appropriate conclusions. A Little or no evidence of corn or grasp of the knowle and coherent thinking. Midraw appropriate conclusivith laboratory components.	phly effective lab skills and techniques. If effective organizational and presentatic as broad range of knowledge and skil asp of the subject. Show evidence of an a Correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytic thindives. Mostly correct but some errore organizational and presentational skills required from of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational and of knowledge and skills required from the subject of the subject inimally effective or ineffective lab skills ons. Organization and presentational slent course	Critical use of data and results to draw a mal skills. Ils required for attaining at least most nalytical and critical abilities and logical awappropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s. or attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attional and presentational skills. ed for attaining the course learning out Evidence of little or lack of analytical ars and techniques. Misuse of data and	appropriate and insight t of the course learnin I thinking. Apply effective organizational an rning outcomes. Gener nking. Apply moderate appropriate conclusion ng outcomes. Partial bit logical thinking, but wit data and results to dra tcomes. Evidence of litth do critical abilities, logic results and/or unable it e.  No. of Hours 24 8 6 6 4 100 Assessment Methods	
Course Type Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture w Activitie Lectures Laborato Field won Project w Tutorials Reading Methods	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete created but incomplete grasp of effective lab skills and techniques pratial but limited comma limited grasp, with retentic limited analytical and critiappropriate conclusions. A Little or no evidence of corn or grasp of the knowle and coherent thinking. Midraw appropriate conclusivith laboratory components.  Sory  ork  / Self study  substantial characteristics or substantial conductions and critical conclusions. A construction of the knowle and coherent thinking. Midraw appropriate conclusivith laboratory components.  Sory  ork  / Self study	phly effective lab skills and techniques. I effective organizational and presentatic a broad range of knowledge and skilasp of the subject. Show evidence of all correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytichniques. Mostly correct but some erroe e organizational and presentational skill and of knowledge and skills required for of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational of knowledge and skills required for the scal abilities. Partially effective lab skills Apply limited or barely effective organization and understanding of the subject. Inimally effective or ineffective lab skill ions. Organization and presentational signature.	Critical use of data and results to draw a mal skills.  Ils required for attaining at least most nalytical and critical abilities and logical two appropriate conclusions. Apply effected for attaining most of the course leacal and critical abilities and logical thineous use of data and results to draw s.  The attaining some of the course learning use to expect a most coherent and continues. Limited ability to use attional and presentational skills.  The attaining the course learning out exidence of little or lack of analytical are sand techniques. Limited ability and sills are minimally effective or ineffective with the course learning out the course grade (%)	appropriate and insightf t of the course learnin I thinking. Apply effective organizational an rning outcomes. Generalized appropriate conclusions and outcomes. Partial but logical thinking, but wit data and results to dra toomes. Evidence of little add critical abilities, logic results and/or unable to a.  No. of Hours 24 8 6 6 6 4 100 Assessment Methods to CLO Mappine	
Course Type Course Teaching & Learning Activities Assessment Methods	Fail  Lecture w Activitie Lectures Laborato Field wo Project w Tutorials Reading Methods  Assignm	original thought. Apply hig conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete created but incomplete grasp of effective lab skills and techniques presentational skills.  General but incomplete created but incomplete grasp of effective lab skills and techniques provided and techniques and conclusions. A Little or no evidence of cornograsp of the knowled and coherent thinking. Midraw appropriate conclusions with laboratory components.  Sory  Ory  Ory  Trk  Work  Sory  Self study	phly effective lab skills and techniques. I effective organizational and presentatic a broad range of knowledge and skilasp of the subject. Show evidence of all correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytichniques. Mostly correct but some erroe e organizational and presentational skill and of knowledge and skills required for of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational of knowledge and skills required for the scal abilities. Partially effective lab skills Apply limited or barely effective organization and understanding of the subject. Inimally effective or ineffective lab skill ions. Organization and presentational signature.	Critical use of data and results to draw a mal skills.  Ils required for attaining at least most nalytical and critical abilities and logical aw appropriate conclusions. Apply effected for attaining most of the course lead and critical abilities and logical thin encous use of data and results to draw s.  The attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use ational and presentational skills.  The attaining the course learning out are sand techniques. Misuse of data and skills are minimally effective or ineffective with the course grade (%)  Weighting in final course grade (%)	appropriate and insightf t of the course learnin I thinking. Apply effective organizational and rining outcomes. Genericking. Apply moderated appropriate conclusion and outcomes. Partial by a logical thinking, but with data and results to draw data and results to draw comes. Evidence of little additional abilities, logic results and/or unable to e.  No. of Hours  24  8 6 6 4 100  Assessment Methods to CLO Mappin. CLO 1,2,3,4	
Course Type Course Teaching & Learning Activities Assessment Methods	Fail  Lecture w Activitie Lectures Laborato Field woo Project w Tutorials Reading Methods  Assignm Examina	original thought. Apply highly conclusions. Apply highly Substantial command of outcomes. Substantial gral lab skills and techniques presentational skills.  General but incomplete or but incomplete grasp of effective lab skills and tec Apply moderately effective. Partial but limited comma limited grasp, with retentic limited analytical and criti appropriate conclusions. Little or no evidence of cornor grasp of the knowle and coherent thinking. Midraw appropriate conclusivith laboratory componers.  Sory  rk  work  7 Self study  station	phly effective lab skills and techniques. I effective organizational and presentatic a broad range of knowledge and skilasp of the subject. Show evidence of all correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytichniques. Mostly correct but some erroe e organizational and presentational skill and of knowledge and skills required for of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational of knowledge and skills required for the scal abilities. Partially effective lab skills Apply limited or barely effective organization and understanding of the subject. Inimally effective or ineffective lab skill ions. Organization and presentational signature.	Critical use of data and results to draw a mal skills.  Ills required for attaining at least most nalytical and critical abilities and logical wappropriate conclusions. Apply effected for attaining most of the course lead and critical abilities and logical thineous use of data and results to draw s.  For attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use attonal and presentational skills. The deformal course learning out the straining that course learning out the straining that course learning out the straining the course learning out the straining that course of data and skills are minimally effective or ineffective or ineffective or ineffective or ineffective or grade (%)  Weighting in final course grade (%)	appropriate and insightf t of the course learnin I thinking. Apply effective ctive organizational an rning outcomes. Gener nking. Apply moderatel appropriate conclusion ng outcomes. Partial bi d logical thinking, but wi data and results to dra tocomes. Evidence of litt d critical abilities, logic results and/or unable to e.  No. of Hours  24  8  6  6  4  100  Assessment Methods to CLO Mappin CLO 1,2,3,4 CLO 1,2,3,4	
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail  Lecture w Activitie Lectures Laborato Field woo Project w Tutorials Reading Methods  Assignm Examina	original thought. Apply highly conclusions. Apply highly Substantial command of outcomes. Substantial gralab skills and techniques presentational skills.  General but incomplete or but incomplete grasp of effective lab skills and technique lab	phly effective lab skills and techniques. I effective organizational and presentatic a broad range of knowledge and skilasp of the subject. Show evidence of all correct use of data of results to draw ommand of knowledge and skills required the subject. Evidence of some analytichniques. Mostly correct but some erroe e organizational and presentational skill and of knowledge and skills required for of some relevant information, of the scal abilities. Partially effective lab skills Apply limited or barely effective organizational of knowledge and skills required for the scal abilities. Partially effective lab skills Apply limited or barely effective organization and understanding of the subject. Inimally effective or ineffective lab skill ions. Organization and presentational signature.	Critical use of data and results to draw a mal skills.  Ils required for attaining at least most nalytical and critical abilities and logical aw appropriate conclusions. Apply effected for attaining most of the course lead and critical abilities and logical thin encous use of data and results to draw s.  The attaining some of the course learning subject. Evidence of some coherent and and techniques. Limited ability to use ational and presentational skills.  The attaining the course learning out are sand techniques. Misuse of data and skills are minimally effective or ineffective with the course grade (%)  Weighting in final course grade (%)	appropriate and insightf t of the course learnin I thinking. Apply effective organizational and rining outcomes. Genericking. Apply moderated appropriate conclusion and outcomes. Partial by a logical thinking, but with data and results to draw data and results to draw comes. Evidence of little additional abilities, logic results and/or unable to e.  No. of Hours  24  8 6 6 4 100  Assessment Methods to CLO Mappin. CLO 1,2,3,4	

	Test		5	CLO 1,2,3,4	
Required/recommended	C.J. Hurst: Manual of Environment	tal Microbiology (ASM Press, 2nd e	dition)		
reading and	S.C. McCutcheon & J.L. Schnoor: Phytoremediation: Transformation and Control of Contaminants (Wiley)				
online materials	R. Mitchell & J-D Gu: Environment	al Microbiology (Wiley-Blackwell, 2	nd edition)		
Course Website	http://moodle.hku.hk/				
Additional Course	The course will be offered subject	to a minimum enrollment number a	nd availability of teachers.		
Information	Offer in alternate year from 2011-2	2012			

CAES1000	Core Un	iversity English (6	6 credits)	Academic Ye	<b>ar</b> 2017	
Offering Department	English			Quota		
Course Co-ordinator	Dr N Fong	, English (fongsn@hk	ku.hk)			
Teachers Involved	(Dr N Fon	g,Centre for Applied E	English Studies)			
Course Objectives						
Course Contents & Topics	proficiency Common written act for and us the Moodl skills and students t	The Core University English (CUE) course aims to enhance first-year students' academic English language proficiency in the university context. CUE focuses on developing students' academic English language skills for the Common Core Curriculum. These include the language skills needed to understand and produce spoken and written academic texts, express academic ideas and concepts clearly and in a well-structured manner and search for and use academic sources of information in their writing and speaking. Four online-learning modules through the Moodle platform on academic speaking, academic grammar, academic vocabulary, citation and referencing skills and avoiding plagiarism will be offered to students to support their English learning. This course will help students to participate more effectively in their first-year university studies in English, thereby enriching their first-year experience.				
Course Learning	-		s course, students should be	able to:		
Dutcomes	CLO 1 ide	entify and distinguish monstrate an underst	between main ideas and standing of the arguments / fac	supporting details in lectures and ts expressed	I written texts and	
			nal opinions through critical re			
		gue for and defend a eaking	position in a clear and structu	red way using academic sources,	through writing and	
	CLO 4 de	emonstrate control of g	grammatical accuracy and lex	ical appropriacy in academic comr	nunication	
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offe	er in 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors	Α			uce spoken and written academic texts		
	В	texts. Written language of comprehensible and fluer Good to very good resulf with only minor errors. St argue for a detailed posi speaking. They cite and with ease, although they	contains very few, if any, systemati tt. Students are able to produce spo- udents can almost always clearly an tition. Students almost always use a reference correctly with only a few n may miss some implied meanings ar	ility to fully comprehend and critically inter c errors in grammar and vocabulary. Spo ken and written academic texts which are d concisely explain academic concepts an propriate academic sources to support the on-systematic errors. Students can compre and opinions. Written language is mostly acc	appropriately structure d almost always criticall neir ideas in writing an ehend and interpret text curate but contains a fer	
	С	systematic errors in complex grammar and vocabulary. Spoken language is mostly comprehensible and fluent.  Satisfactory to reasonably good result. Spoken and written academic texts produced by students are sometimes not-well structured but there is some evidence of this ability. Students are sometimes unable to clearly and concisely explain academic concepts. While they can argue for a position, it is not very detailed and tend to be simplistic rather than critical. Students sometimes use sources which are nonacademic and/or not appropriate to support their ideas in writing and speaking. There are some systematic errors in citation and referencing but also evidence of correct systematic use. Students have some difficulty comprehending and critically interpreting texts. They can always understand the main ideas but may miss some of the writer's views and attitudes. Written language is sometimes inaccurate, although errors, when they occur, are more often in complex grammar and vocabulary and there is some evidence of control of simple grammatical structures. Spoken language is generally comprehensible and fluent but at times places strain on the listener.				
	D Fail	Barely satisfactory result. Spoken and written academic texts produced by students are often inappropriately structured but there may be some evidence of this ability. Students are often unable to clearly and concisely explain academic concepts and argue for a position. There is some evidence of an ability to explain academic concepts but not to critically argue for a position. Students often use sources which are nonacademic and/or not appropriate to support their ideas in writing and speaking. There are many systematic errors in citation and referencing however there is evidence of an understanding of some of the conventions of citation and referencing. Students often have difficulty comprehending and interpreting texts, sometimes failing to understand the main ideas and writer's views and attitudes. Written language is often inaccurate containing errors in a range of simple and complex grammar and vocabulary. Spoken language is only sometimes comprehensible and fluent, and strain is frequently placed on the listener.  Unsatisfactory result. Productive skills are too limited to be able to successfully carry out spoken and written assessments. Texts are unstructured and unclear. Students are unable to follow and interpret texts. There are language errors in almost every				
				sments may not have been attempted or co		
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details		No. of Hours	
Learning Activities	Lectures				30	
	Tutorials				6	
	Reading /	Self study			84	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin	
	Assignme	ents		65		

CAES9820	Academ	ic English for	science students (6 credits)	Academic Ye	ar 2017	
Offering Department	English		· · · · · · · · · · · · · · · · · · ·	Quota		
Course Co-ordinator	Ms E Law	, English <i>(ellielaw</i>	@hku.hk)			
Teachers Involved	(Ms E Law	v,Centre for Applie	ed English Studies)			
Course Objectives	Faculty. T their studio within their enabling s	This six credit English-in-the-Discipline course will be offered to second year students studying in the Science Faculty. This course will help students develop the necessary skills to use both written and spoken English within heir studies. Students will learn to better communicate and spontaneously discuss general and scientific concepts within their division, with other scientists as well as to a larger audience. Particular emphasis will be placed on enabling students to identify their own language needs and develop appropriate self-learning strategies to improve heir proficiency.				
Course Contents & Topics	Topics cov - Finding, - Compilin - Contrasti - Writing fo - Organizi grammar; - Critically	pics covered in the course will be: Finding, evaluating and using appropriate academic source materials; Compiling an academic bibliography; Contrasting academic and popular genres of Science; Writing for a specific audience, including stance, shared knowledge, levels of formality; and Organizing and articulating ideas in an academically suitable format including appropriate vocabulary and ammar; and Critically examine their own language proficiency and analyze how that relates to their ability to perform accessfully within their discipline. Developing self-directed learning strategies.				
Course Learning	On succes	ssful completion o	of this course, students should be able to	:		
Outcomes		•	rize disciplinary sources related to a spe	•		
	kn	nowledge	en and spoken) appropriate for a cross-c		on their disciplinary	
	CLO 3 ide	entify their own la	nguage learning needs and implement a	plan to meet those needs		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2017 - 2018	Y 1st	sem 2nd sem	Offer in 2018 - 2019 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	Excellent result. Consistently demonstrates ability to summarize salient points accurately from appropriate and reliable sources using original language. Text uses sources appropriately and demonstrates accurate and appropriate grammatical, lexical and organizational characteristics. Language learning needs are clearly identified and aligned with evidence of planning, self-study and reflection.  B Good to very good result. Usually demonstrates ability to summarize salient points accurately using mostly original language. Text mostly uses sources appropriately and demonstrates mostly accurate and appropriate grammatical, lexical and organizational characteristics. Language learning needs are stated with some reference to evidence of planning and reflection although there is some misalignment between goals and self-study completed.					
	Satisfactory to reasonably good result. Demonstrates some ability to summarize salient points using mostly original language although some inaccuracies are present. Text uses some sources appropriately and demonstrates appropriate but simple grammatical and lexical characteristics with some organizational flaws. Language learning needs are stated with some limited evidence of planning and reflection but goals and self-study are misaligned.					
	D Fail	original language. Tand organizational apparent alignment Unsatisfactory resulted to the control of the control	result. Demonstrates a limited ability to summari. Fext uses sources inappropriately and demonstra flaws. There is a minimal statement of language between goals and self-study. It. Does not demonstrate ability to summarize sext uses no sources and demonstrates serious g eaningful attempt to identify language learning nee	ntes grammatical inaccuracy, inape learning needs, planning and re alient points identify, interpret or rammatical, lexical and/or organiz	propriate lexical choices effection with little or no appropriately paraphrase	
Course Type	Lecture-ha	ased course	5			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Tutorials		seminars		36	
-		/ Self study			120	
	Assessme	•	independent learning work		84	
Assessment Methods	Methods		Details	Weighting in final	Assessment	
and Weighting	Wethous		Details	course grade (%)	Methods to CLO Mapping	
	Assignme	ents	independent learning work	20		
	Essay		other genres of writing	55		
				25		
	Test	est 25 purse materials to be provided electronically through course website.				
Required/recommended reading and online materials		aterials to be prov	rided electronically through course webs			
reading and	Course ma	aterials to be prov	, ,			
reading and online materials	Course ma	s.hku.hk/caes9820	, ,	ite.	ence.	

CHEM1041		tions of chemistry (	(6 credits)	Academic Ye				
Offering Department	Chemistry			Quota	156			
Course Co-ordinator	Dr A P L Tong, Chemistry (apltong@hku.hk)							
Teachers Involved	(Dr A P L Tong, Chemistry)							
Course Objectives	The course aims to provide students who do not have HKDSE Chemistry or an equivalent background but an interested in exploring Chemistry further, with an understanding of the essential fundamental principles and concepts of chemistry.							
Course Contents & Topics	Topic 1: Chemistry: Matter and Measurement (2 hours) Elements, compounds, and mixtures; physical properties of matter; chemical changes and chemical properties measuring mass, length, volume and temperature; atomic structure and subatomic particles; the mole concept and stoichiometry; solutions and concentrations; uncertainty in measurement and significant figures.							
	Topic 2: Gases: Their Properties and Behaviour (6 hours) Gas pressure; the gas laws; the ideal gas law and reaction stiochiometry; the kinetic-molecular theory of gases.							
	Topic 3: Chemical Bonding and Structures (7 hours) Covalent, ionic and metallic bonds; bond energy and chemical change; electronegativity and bond polarity; Lewi structures of molecules and ions; VSEPR Theory and molecular shape.							
	Topic 4: Intermolecular Forces: Liquids, Solids, and Phase Changes (8 hours) Physical states and phase changes; types of intermolecular forces; properties of liquid state; the solid state structure, properties, and bonding; advanced materials e.g. electronic materials, liquid crystals, ceramic materials and polymeric materials.							
	Topic 5: Chemical Equilibrium (4 hours) The equilibrium state and the equilibrium constant; the equilibrium law: calculation of equilibrium constants and reaction quotient; Le Chelier? Principle							
	Topic 6: Introductory Organic Chemistry (9 hours) Homologous series and nomenclature; isomerism; typical reactions of selected functional groups.							
ourse Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 demonstrate knowledge and understanding in relation to some chemical vocabulary, terminology and conventions  CLO 2 demonstrate knowledge and understanding of chemical stoichiometry, the properties of liquids and solids, the nature of gases, phase changes, chemical bonding and structures, and the nature of chemical equilibria							
	CLO 3 demonstrate a basic knowledge of nomenclature, isomerism, and typical reactions of various functional groups of organic compounds  CLO 4 apply the theories and concepts introduced in the course to solve problems, perform calculations, make							
	predictions and rationalize trends							
	CLO 5 organize and present chemical ideas in a clear, logical and coherent way  CLO 6 demonstrate awareness and appreciation of the relevant applications of chemistry in society and in everyday life							
Pre-requisites and Co-requisites and Impermissible combinations)	Level 3 or above in HKDSE Combined Science with Chemistry component or Integrated Science, or equivalent. Students without such background but keen on taking this foundation chemistry course may approach the cours coordinator for consideration.  Not for students with Level 3 or above in HKDSE Chemistry or having taken any level 1 Chemistry course or above.							
	or any equivalent Chemistry course.							
Offer in 2017 - 2018		sem Offer in 2018 - 2		Examination	Dec			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show thorough grasp of the subject. Demonstrate strong analytical and critical abilities and logical thinking with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizations and presentational skills.							
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show substantial grasp of the subject. Demonstrate evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and						
	С	presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show general but incomplete grasp of the subject. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show partial but limited grasp, with retention of some relevant information, of the subject. Demonstrate evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve							
	Fail  Problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Show evidence of little or no grasp of the knowledge and understanding of the subject. Lack of analytical and critical abilities, logica and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Course Type	Lecture-b	ased course						
ourse Teaching	Activities		Details		No. of Hours			
& Learning Activities	Lectures				36			
	Tutorials				12			
	Reading / Self study		D 4.71		100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments			20	CLO 1,2,3,4,5			
	Examination			65	CLO 1,2,3,4,5,6			
	Test			15	CLO 1,2,3,4,5,6			
Required/recommended	'	ci; Herring; Madura; Bis	ssonnette: General Chemistry: Princ	iples and Modern Applica	ations, latest edition			
eading and online materials			stry: The Molecular Science, latest ed , latest edition, Brookes/Cole	lition, Brookes/Cole				
Additional Course			EM1042 General Chemistry I					
nformation								

CHEM1042	Genera	I chemistry I (6 cre	dits)	Academic Ye	ear 2017			
Offering Department	Chemistry			Quota	344			
Course Co-ordinator		Tong, Chemistry (aplto	ong@hku.hk)					
Teachers Involved	(Dr A P L Tong, Chemistry)							
Course Objectives	The course aims to provide students with a solid foundation of the basic principles and concepts of chemistry. also provides students with hands-on training of basic laboratory skills and techniques including volumetric analysis, preparation, purification and characterization of chemical substances and some basic instrumental methods. Students will be equipped with a good foundation of theoretical and practical knowledge and skills for further studies in Chemistry.							
Course Contents & Topics	1. Chemistry: its nature and method Physical properties; chemical changes and chemical properties; elements and compounds; measuring mass, length, volume and temperature; atomic structure and subatomic particles; the mole concept and stoichiometry solutions and concentrations; uncertainty in measurement and significant figures.  2. Atoms: the quantum world							
	Electromagnetic radiation and matter; Planck's quantum theory; the Bohr model of the hydrogen atom; the quantum mechanical model of the atom; quantum numbers, energy levels, and atomic orbitals; shapes of atomic orbitals; electron configurations; periodic trends: atomic radii, ionic radii, ionization energies, and electron affinities. 3. Chemical bonding and structures Review on covalent, ionic and metallic bond. Covalent bonds and molecular structures (VSEPR, VB theory).  4. Energetics and kinetics of reactions							
	Heat and work; the first law of thermodynamics; heat of reactions; spontaneity of changes. Reaction rate; factors that influence reaction rate; rate laws: differential and integrated rate laws; temperature and reaction rate; reaction mechanisms.  5. Acid-Base equilibria							
Course Learning	Acid-base concepts; equilibria in solutions of weak acids and in weak bases; ionization constants; molecul properties and acid strength; acid-base properties of salt solutions; buffer solutions; acid-base titrations.  On successful completion of this course, students should be able to:							
Outcomes	CLO 1 demonstrate a basic knowledge and understanding of the microscopic nature of atomic structure and concepts of chemical bonding and their relationships with the bulk properties of matter							
	CLO 2 demonstrate knowledge and understanding in relation to thermodynamics and kinetics of reactions as well as aqueous equilibria including acid-base equilibria  CLO 3 apply the theories and concepts introduced in the course to solve problems, perform calculations, make							
	predictions and rationalize trends  CLO 4 carry out chemical experiments with proper procedures, record experimental oberservations accurately,							
	and interpret and evaluate the experimental data CLO 5 organize and present chemical ideas in a clear, logical and coherent way							
	CLO 6 demonstrate awareness and appreciation of the relevant applications of chemistry in society and in everyday life							
Pre-requisites			emistry or equivalent or a pass i					
and Co-requisites and Impermissible combinations)	Not for students having taken any level 1 Chemistry course (except for CHEM1041) or above or any equivalent Chemistry course.							
Offer in 2017 - 2018	Y 1s	t sem 2nd sem Offe	er in 2018 - 2019 · Y	Examination	Dec May			
Grade Descriptors	A							
(A+ to F)	learning outcomes. Show thorough grasp of the subject. Demonstrate strong analytical and critical abilities and logical thinking with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Show highly effective lab skills and techniques. Apply highly effective organizational and presentational skills.							
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show substantial grasp of the subject. Demonstrate evidence of analytical and critical abilities and logica thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Show effective lab skills and techniques. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show general but incomplete grasp of the subject. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Show moderately effective lab skills and techniques.						
	Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show partial but limited grasp, with retention of some relevant information, of the subject. Demonstrate evidence of some							
	coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Demonstrate partially effective lab skills and techniques. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Show evidence of little or no grasp of the knowledge and understanding of the subject. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective.							
Course Type	Lecture v	vith laboratory compon	ent course	<u> </u>				
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Lectures				24			
	Laboratory				24			
	Tutorials Reading / Self study				6			
		/ Seit study	B 4 7		100			
	_		Details	Weighting in final	Assessment			
	Methods		Details	course grade (%)	Methods to CLO Mapping			
	Methods	ation	Details	60	to CLO Mapping CLO 1,2,3,5,6			
Assessment Methods and Weighting	Methods  Examina Laborato		DetailS	60 25	to CLO Mapping CLO 1,2,3,5,6 CLO 1,2,3,4,5,6			
and Weighting	Methods  Examina Laborato Test	ation ory reports		60 25 15	to CLO Mapping CLO 1,2,3,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3,5,6			
and Weighting Required/recommended	Examina Laborato Test 1) Petruo	ation ory reports		60 25	to CLO Mappin CLO 1,2,3,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3,5,6			
and Weighting Required/recommended eading and	Examina Laborato Test 1) Petruc Pearson 2) Moore	ntion ory reports oci; Herring; Madura; B oc; Stanitski; Jurs: Chem	issonnette: General Chemistry	60 25 15 : Principles and Modern Applica	to CLO Mappin CLO 1,2,3,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3,5,6			
and Weighting	Examina Laborato Test 1) Petruc Pearson 2) Moore 3) Zumda	ntion ory reports oci; Herring; Madura; B oc; Stanitski; Jurs: Chem ahl; Zumdahl: Chemistr	issonnette: General Chemistry istry: The Molecular Science, la y, latest edition, Brookes/Cole	60 25 15 : Principles and Modern Applica	to CLO Mappin CLO 1,2,3,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3,5,6 ations, latest edition			

CHEM1043		chemistry II (6	credits)	Academic Ye	-		
Offering Department	Chemistry		oltona@hku hki	Quota	290		
Course Co-ordinator Teachers Involved		Or A P L Tong, Chemistry (apltong@hku.hk) Or A P L Tong,Chemistry)					
reachers involved		Phillips, Chemistry)					
Course Objectives			on of CHEM1042 General Cher	mistry I. It aims to further consc	olidate some of the		
	important fundamentals of chemistry that underlie many topics and principles across the physical sciences. The course prepares students to pursue a major in chemistry or in other aspects that require a good foundation in chemistry.						
Course Contents	1. Gases						
& Topics	gases; diff 2. Structur Bonding in some simp 3. Solution Types of s gases; va nonelectro 4. Solubility limitations analysis. 5. Entropy A quick re	fusion and effusion; re and Bonding: The nhomonuclear and ple polyatomic mole in sand their Properties olutions; intermole apor pressures of solyte solutions; sof the Ksp concepty & Gibbs Energy eview on entropy arrange and equilibriu	; non-ideal gases. e Delocalized Approach: Molecu l heteronuclear diatomic molecul ecules; bonding in metals (band t ties cular forces and the solution pro- colutions; osmotic pressure; free- tions of electrolytes; colloidal mix n Equilibria relationship between solubility ot; precipitation; solubility and ph	es of first and second period of etheory).  cess; solution formation and equileting-point depression and boiling	elements; bonding i ibrium; solubilities of ig-point elevation of solubility equilibrians; qualitative catio		
	Electrode	potentials and the	eir measurement; standard electrotysis; i	trode potentials; Ecell, delta G, industrial electrolysis processes.	and K; Ecell as a		
Course Learning Outcomes	On succes	ssful completion of emonstrate a knowl	this course, students should be a edge and understanding of the p	able to: properties and behavior of gases	and apply gas laws		
			theory to processes involving galledge, and understanding in rela	ases ation to solutions and their prope	erties solubility and		
			a, and also electrochemistry	ation to obligations and their prope	ruoo, oorabiiity aria		
	CLO 3 ap	oply molecular orbit	tal theory to explain the formation	on and properties of diatomic mo	olecules of first and		
	second period of elements and of some simple polyatomic molecules						
	CLO 4 demonstrate a knowledge and understanding of the relationship between free energy and spontaneity of						
	reaction						
	CLO 5 apply the theories and concepts introduced in the course to solve problems, perform calculations, make predictions and rationalize trends						
	CLO 6 organize and present chemical ideas in a clear, logical and coherent way						
	CLO 7 demonstrate awareness of the relevant applications of chemistry in society and in everyday life						
Pre-requisites (and Co-requisites and Impermissible		HEM1042; and udents in 2014-15 c	ohort or before having taken CH	EM2541.			
combinations) Offer in 2017 - 2018	Y 1st	sem 2nd sem (	Offer in 2018 - 2019 : Y	Examination	Dec May		
Grade Descriptors	A						
(A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show thorough grasp of the subject. Demonstrate strong analytical and critical abilities and logical thinking, with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show substantial grasp of the subject. Demonstrate evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show general but incomplete grasp of the subject. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show partial but limited grasp, with retention of some relevant information, of the subject. Demonstrate evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail	Demonstrate little or ne evidence of little or ne	no evidence of command of knowledge and ograsp of the knowledge and understar . Show very little or no ability to apply kn	oresentational skills.  Ind skills required for attaining the course I adding of the subject. Lack of analytical are nowledge to solve problems. Organization	d critical abilities, logica		
Course Type		ased course					
Course Teaching	Activities	5	Details		No. of Hours		
& Learning Activities	Lectures				36 12		
		/ Self study			100		
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods		
	Assignme	ents		15	to CLO Mapping		
	Examinat			70	CLO 1,2,3,4,5,6,		
	Test			15	CLO 1,2,3,4,5,6,1		
Required/recommended		ci; Herring; Madura	; Bissonnette: General Chemistr				
reading and	Pearson	. 3,		,	,		
online materials		) Petrucci; Herring; Madura; Bissonnette: General Chemistry: Principles and Modern Applications, latest edition, earson ) Moore; Stanitski; Jurs: Chemistry: The Molecular Science, latest edition, Brookes/Cole					

CHEM1044	Mathema	atics in chemistr	y (6 credits)		Academic Year	2017
Offering Department	Chemistry		,		Quota	80
Course Co-ordinator	Prof C M (	Che, Chemistry (cm	che@hku.hk)			
Teachers Involved	(Dr A M Y Yuen, Chemistry) (Dr J Yang, Chemistry) (Prof A S C Cheung, Chemistry)					
Course Objectives	Mathematical calculations are necessary to explore important concepts in chemistry. This course aims to equip students with a basic knowledge of some of the mathematics that will be used in courses covered in the Chemistry major curriculum to enable them to apply the mathematical skills to problems in chemistry. Students taking this course are expected to already have achieved level 2 or above in Module 1 or Module 2 of HKDSE Mathematics of equivalent, or a pass in MATH1011 University Mathematics I. As far as possible, the mathematical concepts covered in this course will be put in the context of chemical problems.					
Course Contents & Topics			nometry, Calculus, Comp , Fourier series, and Elem		trix, Linear equa	ation, Differentia
Course Learning	On succes	sful completion of th	nis course, students shoul	d be able to:		
Outcomes	CLO 1 de	monstrate knowledg	e and understanding of th	ne essential mathematics	used in chemistr	У
	CLO 2 ap	ply mathematical sk	ills to solve basic problem	is in chemistry		
			oping with a higher level physical chemistry course		in relevant cours	ses for chemistry
Pre-requisites			enrolled in this course; a			
(and Co-requisites and Impermissible combinations)		above in Module 1	or Module 2 of HKDSE Ma		or	
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018	3 - 2019 : Y		Examination	May
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.					
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.				
	D					
	<b>Fail</b> Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or n being able to complete the solution.					eir applications, or not
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	<b>i</b>	Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Reading /	Self study				100
Assessment Methods and Weighting	Methods		Details		ing in final grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents			20	CLO 1,2,3
	Examinat				60	CLO 1,2,3
	Test				20	CLO 1,2,3
Required/recommended reading and online materials			ett: Maths for Chemists, 2 Maths Book, 2nd Edition, 0		'	

CHEM2041	Principles of chemistry (6 credits)	Academic Year	2017			
Offering Department	Chemistry	Quota	140			
Course Co-ordinator	Dr I K Chu, Chemistry (ivankchu@hku.hk)					
Teachers Involved						
Course Objectives	This course is designed for non-chemistry major students covering basic princ	ciples of chemistry.				
Course Contents & Topics	Gas Laws and the Kinetic Theory of Gases Thermodynamics: work, heat, the zeroth and first law of thermodynamicapacities, thermochemistry, Hess's Law, Kirchhoff's Law, the second and the Gibbs free energy, spontaneity, equilibrium, coupled reaction; Transport Phenomena: diffusion, viscosity of gases, diffusion in liquids and vischemical Kinetics: rate of reactions, orders of reactions, rate laws, measurement of reaction rates, enzyme kinetics, enzyme inhibition, temperate Chemical Equilibrium; Equilibria in single-, and two component systems: phase transitions, phase dipotential; liquid/liquid systems; Introduction to acids and bases: calculation on concentration of different chand polyprotic acids, activity; Introduction to Spectroscopy: UV/Visible absorption spectroscopy, Bee identification of functional groups; NMR Spectroscopy, Larmor frequency & coupling multiplicities; Mass Spectrometry, isotopic distribution, determination	cs, internal energy ird laws of thermody scosity of liquids, ion reaction mechanismure effect on rates; iagrams and the phasemical species in a str-Lambert Law; IR shemical shift, peak is	rnamics, entropy, ic conduction; n, experimental use rule, chemical solution, diprotic Spectroscopy, ntegral, spin-spin			
Course Learning Outcomes  Pre-requisites (and Co-requisites and Impermissible combinations)	On successful completion of this course, students should be able to:  CLO 1 explain the principles of the thermochemistry, chemical kinetics, chemical equilibrium, physical properties of solutions and gases  CLO 2 explain the principles of the spectroscopy, and spectrometry  Pass in CHEM1042; and  Not for students who have passed in CHEM2341, or have already enrolled in this course; and Not for students who have passed in CHEM2441, or have already enrolled in this course; and Not for Students who have passed in CHEM2541, or have already enrolled in this course; and Not for Chemistry major students.					

Offer in 2017 - 2018	N C	Offer in 2018 - 2019 : N		Examination		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show strong ability to apply and integrate knowledge and theory, and strong ability to analyze problems related to general chemistry and spectroscopy.				
	В	to the modern chemist	ry, instrumentations and applicati	erstanding of essential facts, concepts, princi ons of spectrometry and spectroscopy for a , and ability to analyze problems related to	chemical analysis. Show	
	С	theories relating to the analysis. Show evidence	modern chemistry, instrumentation	ledge and understanding of essential facts, ons and applications of spectrometry and spegrate knowledge and theory, and to analyze	ectroscopy for chemical	
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show evidence of limited abilities to apply and integrate knowledge and theory, and limited ability to analyze problems to most familiar situations related to general chemistry and spectroscopy.				
	Fail	theories relating to the analysis. Show little or	modern chemistry, instrumentation	edge and understanding of essential facts, ons and applications of spectrometry and sp and integrate knowledge and theory, and little mistry and spectroscopy.	ectroscopy for chemical	
Course Type	Lecture-	-based course				
Course Teaching	Activiti	es	Details	Details		
& Learning Activities	Lecture	S			36	
	Tutorial	S			12	
	Reading	g / Self study			100	
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignr	nents		25	CLO 1,2	
	Examin	ation		75	CLO 1,2	
Required/recommended reading and online materials	Spectro	Spectroscopy for the biological science, by Gordon G. Hammes, Wiley-Interscience (2005)				

CHEM2241	Analytical	l chemistry I (6 c	redits)		Academic Yea	ar 2017	
Offering Department	Chemistry	- ,	•		Quota	120	
Course Co-ordinator	Dr W T Cha	n (1st sem); Dr I K C	Chu (2nd sem), Chemistr	y (wtchan@hk	u.hk; ivankchu@hku.hk)		
Teachers Involved	(Dr I K Chu,						
		an,Chemistry)					
Course Objectives	including en reference to The laborat	The course aims to introduce the basic principles of chemical analysis. The principles of chemical measuremen including error analysis, quality assurance and calibration, data acquisition and processing, will be discussed wit reference to methods of chemical analysis that are based on chemical equilibrium and stoichiometric reactions. The laboratory classes will include experiments demonstrating modern approaches of data acquisition and processing as well as chemical analysis based on chemical equilibrium.					
Course Contents & Topics	Measureme calibration of	nt: analog and dig urves and least squ	ital measurement, accu are method for linear plo	uracy and pre	cision, comparing mear	ns and deviati	
			analytical procedures		-hililih-i	-1	
			nicai anaiysis: aqueous y, precipitation reactivity		chemical equilibrium; and	arysis by acid-	
Course Learning			s course, students should				
Outcomes			oles of chemical measur				
Julcomes					s such as acid-base neut	ralization	
				iemicai anaiysi	s such as acid-base neur	Ialization	
)		, , , ,	us for chemical analysis	hafara).			
Pre-requisites			s admitted in 2014-15 or		hia aayuraa (far atyudanta e	admitted in 201	
and Co-requisites	Pass in CHEM1042; and Pass in CHEM1043, or already enrolled in this course (for students admitted in 2015-						
and Impormiosible	or thoroaftor	-\		ly cilioned in t	ins course (for students t		
•	or thereafter	-)		ry crironed in t	this course (for students t		
combinations)		,		ly chiloloca in t			
combinations) Offer in 2017 - 2018	Y 1st se	em 2nd sem Offe	er in 2018 - 2019 : Y		Examination	Dec May	
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Y 1st se	em 2nd sem Offe Demonstrate thorough gr ability to apply knowledg and techniques and critic organization and presenta	er in 2018 - 2019 : Y asp of the subject. Show evid e to a wide range of complex, all use of data and results to d ation skills.	lence of strong ar familiar and unfai draw appropriate a	Examination halytical abilities, logical and individual abilities, logical and individual abilities abilit	Dec May dependent thinking ighly proficient lab onstrate highly eff	
combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st se	em 2nd sem Offe Demonstrate thorough grability to apply knowledg and techniques and critic organization and presents Demonstrate substantial ndependent thinking, and	er in 2018 - 2019 : Y asp of the subject. Show evide to a wide range of complex, al use of data and results to c ation skills. grasp of the subject. Show the ability to apply knowledge to	lence of strong ar familiar and unfar fraw appropriate a evidence of analy familiar and som	Examination halytical abilities, logical and inhiliar situations. Demonstrate h	Dec May dependent thinking ighly proficient lat onstrate highly eff ing, some eviden trate proficient lat	
combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st se	em 2nd sem Offee Demonstrate thorough grability to apply knowledg and techniques and critic organization and presente Demonstrate substantial ndependent thinking, and techniques and corro- oresentation skills. Demonstrate general but evidence of independent echniques and mostly ce	er in 2018 - 2019 : Y asp of the subject. Show evice to a wide range of complex, al use of data and results to c ation skills. grasp of the subject. Show d ability to apply knowledge to ect use of data and results to incomplete grasp of the subjethinking, and ability to apply kn	lence of strong ar familiar and unfar fraw appropriate a evidence of analy familiar and som o draw appropriate ect. Show evidenchowledge to most ise of data and r	Examination halytical abilities, logical and in hiliar situations. Demonstrate h hind insightful conclusions. Dem htical abilities and logical think he unfamiliar situations. Demons	Dec May dependent thinking ighly proficient lab onstrate highly eff ting, some eviden trate proficient lab ective organizatio and logical thinking a adequate lab skil	
combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st se	em 2nd sem Offee Demonstrate thorough gr abiliity to apply knowledg and techniques and critic organization and presenta Demonstrate substantial ndependent thinking, and and techniques and corro- rosentation skills. Demonstrate general but evidence of independent echniques and mostly co moderately effective orga Demonstrate partial but analytical abilities, little o Demonstrate partially ef conclusions. Demonstrately	er in 2018 - 2019: Y asp of the subject. Show evide to a wide range of complex, al use of data and results to c ation skills. grasp of the subject. Show d ability to apply knowledge to ect use of data and results to incomplete grasp of the subject thinking, and ability to apply knowledge to er to some erroneous inization and presentation skills limited grasp, with retention or or no evidence of independe fective lab skills and techniq limited or barely effective org	lence of strong ar familiar and unfai draw appropriate a evidence of analy familiar and some of draw appropriate act. Show evidence of data and results are some relevant in thinking, and ligues and limited anization and preserved.	Examination halytical abilities, logical and in- miliar situations. Demonstrate hand insightful conclusions. Demonstrate end insightful conclusions. Demonstrate end insightful conclusions. Demonstrate efficie of some analytical abilities a familiar situations. Demonstrate esults to draw appropriate co- information, of the subject. Shimited ability to apply knowled ability to use data and resultentation skills.	Dec May dependent thinking ighly proficient lat onstrate highly efficient latective organization and logical thinking adequate lab skill inclusions. Demon low evidence of ligge to solve probis to draw appropriate thinking adequate lab skill inclusions.	
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combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Y 1st se	em 2nd sem Offee Demonstrate thorough gr abiliity to apply knowledg and techniques and critic organization and presenta Demonstrate substantial ndependent thinking, and and techniques and corro resentation skills. Demonstrate general but evidence of independent echniques and mostly co moderately effective orga Demonstrate partial but analytical abilities, little of Demonstrate partially eff conclusions. Demonstrate Demonstrate little or no abilities, logical and inde minimally effective or ine	er in 2018 - 2019: Y asp of the subject. Show evide to a wide range of complex, al use of data and results to c ation skills. grasp of the subject. Show d ability to apply knowledge to ect use of data and results to incomplete grasp of the subject thinking, and ability to apply knorrect but some erroneous u inization and presentation skills limited grasp, with retention or or no evidence of independe fective lab skills and techniq limited or barely effective org grasp of the knowledge and ependent thinking, and very I frective lab skills and techniq frective lab skills and techniq ependent thinking, and very I	lence of strong ar familiar and unfail draw appropriate a evidence of analy familiar and some of draw appropriate act. Show evidence of data and r s. of some relevant nt thinking, and limited anization and presunderstanding of title or no ability uses and misuse of	Examination  alytical abilities, logical and in  miliar situations. Demonstrate h  and insightful conclusions. Dem  ytical abilities and logical think  e unfamiliar situations. Demonstrate eff  be of some analytical abilities a  familiar situations. Demonstrate  esults to draw appropriate co  information, of the subject. Sh  imited ability to apply knowled  ability to use data and result  sentation skills.  the subject. Show little or no  to apply knowledge to solve  of data and results and/or una	Dec May dependent thinking ighly proficient lat onstrate highly efficient late ective organization and logical thinking adequate lab skill inclusions. Demon low evidence of lidge to solve problems to draw appropriate evidence of ana problems. Demon ble to draw appropriate evidence of ana problems.	
combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 1st se	em 2nd sem Offee Demonstrate thorough gr abiliity to apply knowledg and techniques and critic organization and presente Demonstrate substantial ndependent thinking, and and techniques and cornoresentation skills. Demonstrate general but evidence of independent echniques and mostly comoderately effective orga Demonstrate partial but analytical abilities, little of Demonstrate partially eff conclusions. Demonstrate Demonstrate little or no abilities, logical and inde minimally effective or ine conclusions. Demonstrate	er in 2018 - 2019: Y asp of the subject. Show evide to a wide range of complex, al use of data and results to c ation skills. grasp of the subject. Show d ability to apply knowledge to ect use of data and results to incomplete grasp of the subject thinking, and ability to apply knorrect but some erroneous u inization and presentation skills limited grasp, with retention or or no evidence of independe fective lab skills and techniq limited or barely effective org grasp of the knowledge and ependent thinking, and very I frective lab skills and techniq frective lab skills and techniq ependent thinking, and very I	lence of strong ar familiar and unfail draw appropriate a evidence of analy familiar and some of draw appropriate act. Show evidence of data and r s. of some relevant nt thinking, and limited anization and presunderstanding of title or no ability uses and misuse of	Examination  alytical abilities, logical and in  miliar situations. Demonstrate h  and insightful conclusions. Dem  ytical abilities and logical think  e unfamiliar situations. Demonstrate eff  be of some analytical abilities a  familiar situations. Demonstrate  esults to draw appropriate co  information, of the subject. Sh  imited ability to apply knowled  ability to use data and result  sentation skills.  the subject. Show little or no  to apply knowledge to solve  of data and results and/or una	Dec May dependent thinking ighly proficient lat onstrate highly eff ting, some eviden trate proficient lat ective organizatio and logical thinking adequate lab skil inclusions. Demon low evidence of li dge to solve prob ts to draw appro-	
combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 1st se	em 2nd sem Offee Demonstrate thorough gr abiliity to apply knowledg and techniques and critic organization and presente Demonstrate substantial ndependent thinking, and and techniques and cornoresentation skills. Demonstrate general but evidence of independent echniques and mostly comoderately effective orga Demonstrate partial but analytical abilities, little of Demonstrate partially eff conclusions. Demonstrate Demonstrate little or no abilities, logical and inde minimally effective or ine conclusions. Demonstrate	er in 2018 - 2019 : Y asp of the subject. Show evide to a wide range of complex, al use of data and results to c ation skills. grasp of the subject. Show d ability to apply knowledge to ect use of data and results to incomplete grasp of the subject thinking, and ability to apply knorrect but some erroneous u inization and presentation skills limited grasp, with retention or or no evidence of independe fective lab skills and techniq limited or barely effective org grasp of the knowledge and ependent thinking, and very I ffective lab skills and techniq infective lab skills and techniq infective lab skills and techniq eincoherent organization and ent course	lence of strong ar familiar and unfail draw appropriate a evidence of analy familiar and some of draw appropriate act. Show evidence of data and r s. of some relevant nt thinking, and limited anization and presunderstanding of title or no ability uses and misuse of	Examination  alytical abilities, logical and in  miliar situations. Demonstrate h  and insightful conclusions. Dem  ytical abilities and logical think  e unfamiliar situations. Demonstrate eff  be of some analytical abilities a  familiar situations. Demonstrate  esults to draw appropriate co  information, of the subject. Sh  imited ability to apply knowled  ability to use data and result  sentation skills.  the subject. Show little or no  to apply knowledge to solve  of data and results and/or una	Dec May dependent thinking ighly proficient lat onstrate highly efficient late ective organization and logical thinking adequate lab skill inclusions. Demon low evidence of lidge to solve problems to draw appropriate evidence of ana problems. Demon ble to draw appropriate evidence of ana problems.	
combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 1st se  A	em 2nd sem Offee Demonstrate thorough gr abiliity to apply knowledg and techniques and critic organization and presente Demonstrate substantial ndependent thinking, and and techniques and cornoresentation skills. Demonstrate general but evidence of independent echniques and mostly comoderately effective orga Demonstrate partial but analytical abilities, little of Demonstrate partially eff conclusions. Demonstrate Demonstrate little or no abilities, logical and inde minimally effective or ine conclusions. Demonstrate	er in 2018 - 2019 : Y asp of the subject. Show evide to a wide range of complex, al use of data and results to c ation skills. grasp of the subject. Show d ability to apply knowledge to ect use of data and results to incomplete grasp of the subject thinking, and ability to apply knorrect but some erroneous u inization and presentation skills limited grasp, with retention or or no evidence of independe fective lab skills and techniq limited or barely effective org grasp of the knowledge and ependent thinking, and very I ffective lab skills and techniq infective lab skills and techniq infective lab skills and techniq eincoherent organization and ent course	lence of strong ar familiar and unfail draw appropriate a evidence of analy familiar and some of draw appropriate act. Show evidence of data and r s. of some relevant nt thinking, and limited anization and presunderstanding of title or no ability uses and misuse of	Examination  alytical abilities, logical and in  miliar situations. Demonstrate h  and insightful conclusions. Dem  ytical abilities and logical think  e unfamiliar situations. Demonstrate eff  be of some analytical abilities a  familiar situations. Demonstrate  esults to draw appropriate co  information, of the subject. Sh  imited ability to apply knowled  ability to use data and result  sentation skills.  the subject. Show little or no  to apply knowledge to solve  of data and results and/or una	Dec May dependent thinking ighly proficient lat onstrate highly eff inghly proficient lat extrate proficient lat ective organization adequate lab skill inclusions. Demon low evidence of lidge to solve probles to draw approficients. Demon evidence of ana problems. Demon ble to draw approficient of the draw approficient o	
Course Type Course Teaching	Y 1st se  A	em 2nd sem Offee Demonstrate thorough gr abiliity to apply knowledg and techniques and critic organization and presente Demonstrate substantial ndependent thinking, and and techniques and corn orgeneration skills. Demonstrate general but evidence of independent echniques and mostly co moderately effective orga Demonstrate partial but analytical abilities, little o Demonstrate partially eff conclusions. Demonstrate Demonstrate little or no abilities, logical and inde minimally effective or ine conclusions. Demonstrate	er in 2018 - 2019 : Y asp of the subject. Show evide to a wide range of complex, al use of data and results to c ation skills. grasp of the subject. Show d ability to apply knowledge to ect use of data and results to incomplete grasp of the subject thinking, and ability to apply knorrect but some erroneous u inization and presentation skills limited grasp, with retention or or no evidence of independe fective lab skills and techniq limited or barely effective org grasp of the knowledge and ependent thinking, and very I ffective lab skills and techniq infective lab skills and techniq infective lab skills and techniq eincoherent organization and ent course	lence of strong ar familiar and unfail draw appropriate a evidence of analy familiar and some of draw appropriate act. Show evidence of data and r s. of some relevant nt thinking, and limited anization and presunderstanding of title or no ability uses and misuse of	Examination  alytical abilities, logical and in  miliar situations. Demonstrate h  and insightful conclusions. Dem  ytical abilities and logical think  e unfamiliar situations. Demonstrate eff  be of some analytical abilities a  familiar situations. Demonstrate  esults to draw appropriate co  information, of the subject. Sh  imited ability to apply knowled  ability to use data and result  sentation skills.  the subject. Show little or no  to apply knowledge to solve  of data and results and/or una	Dec May dependent thinking ighly proficient lab onstrate highly eff ting, some evident trate proficient lab ective organization and logical thinking a adequate lab skill inclusions. Demon low evidence of lidge to solve problems to draw appropriate evidence of ana problems. Demonoble to draw appropriate of the problems of the problems of the problems. Demonoble to draw appropriate vidence of the problems of the problems of the problems. Demonoble to draw appropriate vidence of the problems of the profice	
combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1st set  A	em 2nd sem Offee Demonstrate thorough gr ability to apply knowledg ability to apply knowledg and techniques and critic organization and presenta Demonstrate substantial ndependent thinking, and techniques and corro- oresentation skills. Demonstrate general but exidence of independent echniques and mostly of moderately effective orga Demonstrate partiall but analytical abilities, little of Demonstrate partially effocnclusions. Demonstrate Demonstrate ititle or no abilities, logical and inde minimally effective or ine conclusions. Demonstrate conclusions. Demonstrate ititle or no abilities, logical and inde minimally effective or ine conclusions. Demonstrate it laboratory componer	er in 2018 - 2019 : Y asp of the subject. Show evide to a wide range of complex, al use of data and results to c ation skills. grasp of the subject. Show d ability to apply knowledge to ect use of data and results to incomplete grasp of the subject thinking, and ability to apply knorrect but some erroneous u inization and presentation skills limited grasp, with retention or or no evidence of independe fective lab skills and techniq limited or barely effective org grasp of the knowledge and ependent thinking, and very I ffective lab skills and techniq infective lab skills and techniq infective lab skills and techniq eincoherent organization and ent course	lence of strong ar familiar and unfail draw appropriate a evidence of analy familiar and some of draw appropriate act. Show evidence of data and r s. of some relevant nt thinking, and limited anization and presunderstanding of title or no ability uses and misuse of	Examination  alytical abilities, logical and in  miliar situations. Demonstrate h  and insightful conclusions. Dem  ytical abilities and logical think  e unfamiliar situations. Demonstrate eff  be of some analytical abilities a  familiar situations. Demonstrate  esults to draw appropriate co  information, of the subject. Sh  imited ability to apply knowled  ability to use data and result  sentation skills.  the subject. Show little or no  to apply knowledge to solve  of data and results and/or una	Dec May dependent thinking ighly proficient lat onstrate highly eff inghly proficient lat extrate proficient lat ective organization adequate lab skill inclusions. Demon low evidence of lidge to solve probles to draw approficients. Demon evidence of ana problems. Demon ble to draw approficient of the draw approficient o	

and Weighting			course grade (%)	Methods to CLO Mapping
	Assignments		5	CLO 1,2
	Examination		65	CLO 1,2
	Laboratory reports		20	CLO 3
	Test		10	CLO 1,2
Required/recommended reading and online materials	Skoog, West, Holler and Crouch, "	Fundamentals of Analytical Chemis	try", latest edition, Cenga	ige Learning
Additional Course Information	Laboratory classes are mandatory course.	. Students must complete ALL exp	periments and laboratory	reports to pass this

CHEM2341	Inorganic (	chemistry I (6 cre	dits)	Academic Year	2017		
Offering Department	Chemistry			Quota	120		
Course Co-ordinator	Prof V W W	/am (1st sem); Dr H	Y Au Yeung (2nd sem), Chemistry (wwy	am@hku.hk; hoyuay@	hku.hk)		
Teachers Involved	(Dr A M Y Yuen, Chemistry)						
Course Objectives		(Prof V W W Yam / Dr H Y Au Yeung, Chemistry)					
course Objectives		To provide students with the basic principles and knowledge of inorganic chemistry and to introduce their relevance to biological processes and materials science. This course provides the foundation for further studies in inorganic chemistry.					
Course Contents & Topics	absorption a	nd magnetic proper chemistry of selecte	bonding of transition metal complexes ties of metal complexes; chemical read d main group elements and transition	actions of metal comp	lexes: redox and		
Course Learning Outcomes	On successfu CLO 1 unde	ul completion of this created the basic pring	course, students should be able to: nciples and concepts of inorganic cher ogical processes and materials science	nistry and appreciate t	heir relevance to		
	CLO 2 demo	onstrate knowledge a onstrate knowledge a	nd understanding of the acid-base conc and understanding of the structure and as and their relevance to the electronic	bonding of main group			
	CLO 4 demo	onstrate knowledge a nermodynamic and ki	nd understanding of the thermodynamic netic aspects of substitution and redox r	eactions			
		onstrate knowledge a dexes in bioinorganic	and understanding of the role of mail chemistry	n group elements and	transition metal		
Pre-requisites (and Co-requisites and Impermissible combinations)	students adm Pass in CHE	nitted in 2014-15 or be M1042; and Pass in	students who have passed in CHEM20 efore); CHEM1043, or already enrolled in this enrolled in this course (for students adm	course; and NOT for s	tudents who have		
Offer in 2017 - 2018	· ·	n 2nd sem Offer	,	Examination	Dec May		
Grade Descriptors	A D	emonstrate thorough know	vledge and understanding of essential facts, con- organic chemistry, especially those related to acid-		s relating to the basi		
	B D to m th m in in a la l	spects of metal complexes superty to apply and integrat rong ability to analyze no inclusions relating to the builds and techniques, especemonstrate substantial cor the basic foundation known ain group compounds are modynamic and kinetic aterials science. Show ever organic chemistry. Show porporpirate conclusions rel boratory skills and techniques.	olexes; electronic absorption spectroscopy, magne a nad their reactions; and their relevance to biolog to knowledge and theory relating to the basic for wasic principles and critical use of data and expen- pasic principles and knowledge of inorganic chem- ially in the synthesis and characterization of inorganic chemistry, especially those reland metal complexes; electronic absorption aspects of metal complexes and their reactions idence to apply and integrate knowledge and the evidence to analyze novel problems and corre- ating to the basic principles and knowledge of uses, especially in the synthesis and characterizati	iical processes and materials undation knowledge of inory imental results to draw app iistry. Demonstrate highly efficanic compounds and metal rital facts, concepts, principles ated to acid-base concept; st spectroscopy, magnetic pro- ; and their relevance to biol eory relating to the basic found ct use of data and experim inorganic chemistry. Demor- on of inorganic compounds a	science. Show stron anic chemistry. Show copriate and insightfuective basic laborator experies and insight fuective basic laborator experies as well as operties as well as ogical processes and additional experties as well as operational experies as the control of the company		
	th st as pr ba cc kr kr sy	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, at theories relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concer structure and bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic propertia as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biologic processes and materials science. Show evidence of some abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic chemistry. Show ability to analyze problems to most familiar situations and most correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles a knowledge of inorganic chemistry. Demonstrate moderately effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes.					
	re bo th m kr er in ch	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theori relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concept; structure a bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes a materials science. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic foundati knowledge of inorganic chemistry. Show limited ability to analyze problems to most familiar situations and mostly correct be erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge inorganic chemistry. Demonstrate partially effective basic laboratory skills and techniques, especially in the synthesis are characterization of inorganic compounds and metal complexes.					
	Fail  Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concept; structure and bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes and materials science. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic chemistry. Show little or no ability to analyze problems to most familiar situations and erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of inorganic chemistry. Demonstrate minimally effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes.						
Course Type	Lecture with	laboratory componen	t course				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				24		
a Louining / totivitioo							
	Laboratory				24		

	Reading / Self study			100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		7	CLO 1,2,3,4,5		
	Examination		65	CLO 1,2,3,4,5		
	Laboratory reports		7	CLO 1,2,3,4,5		
	Test		21	CLO 1,2,3,4,5		
Required/recommended reading and online materials	F. A. Cotton; G. Wilkinson; P. L. Gaus: Basic Inorganic Chemistry (John Wiley & Sons, 1995, 3rd ed.) P. Atkins, T. Overton, J. Rourke, M. Weller and F. Armstrong: Shriver & Atkins Inorganic Chemistry (Oxford University Press, 2006, 4th ed.)					
Additional Course Information	Laboratory classes are mandatory course.	y. Students must complete ALL ex	periments and laboratory	reports to pass this		

CHEM2441	Organic	chemistry I (6 ci	redits)	Academic Ye	ear 2017	
Offering Department	Chemistry	/	·	Quota	200	
Course Co-ordinator	Dr X Y Li	(1st sem); Prof P Ch	iu (2nd sem), Chemistry (xiaoyuli@hku	ı.hk; pchiu@hku.hk)		
Teachers Involved	(Dr X Y Li	,Chemistry)				
	(Prof P Cl	niu,Chemistry)				
Course Objectives	examples This cours	To provide students with the basic principles to understand the structure and reactivity of organic molecules, with examples illustrating the role of organic chemistry in daily life and industry.  This course serves as the first part of the complete program on fundamental organic chemistry, to be followed up by CHEM3441 Organic Chemistry II.				
Course Contents	Structure	and bonding of orga	anic compounds, three dimensional st	ructures of organic molec	ules, conformationa	
& Topics	compound	ds, alcohols, thiols,	emistry of alkanes, cycloalkanes, alke and ethers. Organometallic chemistry tions of reaction mechanisms.			
Course Learning	On succe	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 u	nderstand basic con-	cepts and employ the vocabulary of org	ganic chemistry		
	CLO 2 v	isualize and draw thr	ee-dimensional, stereochemically corre	ect representations of orga	anic molecules	
	CLO 3 re	ecognize, discriminat	e and name chiral stereoisomers and o	diastereomers		
	CLO 4 u	nderstand the reactive	vity of the functional groups			
	CLO 5 u	nderstand reaction n	nechanisms and apply mechanistic kno	wledge to solve chemistry	/ problems	
			synthesis of target molecules			
	CLO 7 a	ppreciate the relevar	nce of organic chemistry in biological p	rocesses and daily life		
Pre-requisites	Pass in C	HEM1042; and NOT	for students who have passed in CHI	EM2041, or already enroll	ed in this course (for	
(and Co-requisites and Impermissible combinations)	Pass in C		or before); s in CHEM1043, or already enrolled ir y enrolled in this course (for students a			
Offer in 2017 - 2018			ffer in 2018 - 2019 : Y	Examination		
Grade Descriptors	Α		h mastery at an advanced level of knowledge a			
(A+ to F)		chemical properties, re and a strong ability t	actions and mechanisms of organic chemistry. o analyze and solve novel organic chemistry ecution of lab skills and techniques in organic che	Show a strong ability to integrate problems. Demonstrate highly	e knowledge and theory	
	B Demonstrate substantial command of knowledge and understanding of essential facts and concepts pertaining to the chemical properties, reactions and mechanisms of organic chemistry. Show evidence of ability to integrate knowledge and theory, and evidence of ability to analyze and solve novel organic chemistry problems. Demonstrate effective organization, understanding, and execution of lab skills and techniques in organic chemistry experiments.					
	С	Demonstrate a general but incomplete command of knowledge and understanding of essential facts and concepts pertaining to the chemical properties, reactions and mechanisms of organic chemistry. Show evidence of some ability to integrate knowledge and theory, and evidence of some ability to analyze novel problems. Show a mostly correct use of knowledge to solve most familiar problems. Demonstrate adequately effective organization, understanding, and execution of lab skills and techniques in organic chemistry experiments.				
	D	·				
	Fail	Demonstrate little or no chemical properties, re knowledge and theory,	vevidence of command of knowledge and under actions and mechanisms of organic chemistry. S and little or no ability to analyze novel problems e minimal or no organization, understanding a	Show little or no evidence of abi . Show little or no evidence of ab	lity to apply and integrate pility to solve most familia	
Course Type	Lecture-b	ased course				
Course Teaching	Activities	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
		/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		15	CLO 1,2,3,4,5,6,7	
	Examinat		2 hrs written examination	65	CLO 1,2,3,4,5,6	
	Test		(two midterms)	20	CLO 1,2,3,4,5,6	
		Book: "Organia Ch	,			
Poquirod/rocommonded	Leigibile	Reference Book: "Organic Chemistry", by Paula Y. Bruice, 2014, 7th Edition, Pearson, with e-text and Mastering Chemistry. Chapters 3-13.				
reading and	Chemistry	/. Chapters 3-13.				
Required/recommended reading and online materials Additional Course	Chemistry	/. Chapters 3-13.				

CHEM2442	Fundamentals of organic chemistry (6 credits)	Academic Year	2017
Offering Department	Chemistry	Quota	130

Course Co-ordinator		Dr P H Toy, Chemistry (phtoy@hku.hk)				
Teachers Involved		(Dr P H Toy,Chemistry)				
Course Objectives	the conto	The major objective of this course is to give the students a basic understanding of organic chemistry, especially in the context of daily life. This will be achieved through the introduction of the chemistry of organic functional groups that form the basis of organic molecules. The concepts presented in the lectures will be reinforced by a series of laboratory experiments.				
Course Contents & Topics	carboxyl		al groups such as alkenes, alkyno ives, and amines will be discuss ochemistry.			
Course Learning	On succ	essful completion of this c	ourse, students should be able to			
Outcomes	CLO 1		erstanding of the structure of orga			
	CLO 2		erstanding of the reactivity of orga			
	CLO 3		chemistry plays an important role	e in everyday life		
Pre-requisites (and Co-requisites and Impermissible combinations)		CHEM1042; and tudents who have passed	CHEM2441, or have already enro	olled in this course.		
Offer in 2017 - 2018	Y 19	st sem Offer in 2018 - 20	)19 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	all the course learning out	ery at an advanced level of extensive org comes. Show strong analytical and critic knowledge to a wide range of complex, far	al abilities and logical thinking, v		
	B Demonstrate substantial command of organic chemistry with a broad range of knowledge, and skills required for attaining at leas most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to appl knowledge to familiar and some unfamiliar problems.					
	C Demonstrate general but incomplete command of organic chemistry knowledge, and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar problems.					
	Demonstrate partial but limited command of organic chemistry knowledge, and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.					
	Fail  Demonstrate little or no evidence of command of organic chemistry knowledge, and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.					
Course Type	Lecture	with laboratory componen	t course			
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Lectures	3			24	
	Laborat	•			20	
	Tutorials				5	
	_	/ Self study			100	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	ation		60	CLO 1,2,3	
	Test		Test/Quiz	40	CLO 1,2,3	
Required/recommended reading and online materials	Bruice, F	P.Y.; Essential Organic Ch	nemistry (Pearson, 2016, 3rd edition	on)		
Additional Course Information			EM3441 should take CHEM2441. y. Students must complete ALL e	experiments and laboratory	reports to pass this	

CHEM2443	Fundam (6 credi	nentals of organic chemistry for pharmacy students	Academic Year	2017			
Offering Department	Chemistry	Chemistry Quota 60					
Course Co-ordinator	Dr P H To	by, Chemistry (phtoy@hku.hk)					
Teachers Involved	(Dr P H T	oy,Chemistry)					
Course Objectives	especially functional	or objective of this course is to give pharmacy students a bas in the context of daily life. This will be achieved through the ingroups that form the basis of organic molecules. The concern by a series of laboratory experiments.	introduction of the che	mistry of organic			
Course Contents & Topics	carboxylic	nistry of organic functional groups such as alkenes, alkynes, alky c acids and their derivatives, and amines will discussed, as v conformation and stereochemistry.	, , , , , , , , , , , , , , , , , , , ,				
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 demonstrate basic understanding of structure of organic molecules						
	CLO 2 demonstrate basic understanding of the reactivity of organic molecules						
	CLO 3 appreciate how organic chemistry plays an important role in everyday life						
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for st	HEM1042; and udents who have passed CHEM2442, or already enrolled in this carse is for BPharm students only)	ourse.				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2019 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive organic cher all the course learning outcomes. Show strong analytical and critical abilitie thought, and ability to apply knowledge to a wide range of complex, familiar and	s and logical thinking, with				
	B Demonstrate substantial command of organic chemistry with a broad range of knowledge, and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar problems.						
	С	Demonstrate general but incomplete command of organic chemistry knowled course learning outcomes. Show evidence of some analytical and critical a knowledge to most familiar problems.					
	Demonstrate partial but limited command of organic chemistry knowledge, and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.						

	Fail  Demonstrate little or no evidence of command of organic chemistry knowledge, and skills required fo learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little knowledge to solve problems.					
Course Type	Lecture with laboratory component course					
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laboratory				20	
	Tutorials				5	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examination			60	CLO 1,2,3	
	Test		Test/Quiz	40	CLO 1,2,3	
Required/recommended reading and online materials	Bruice, P.Y.; Es	sential Organic Ch	nemistry (Pearson, 20	016, 3rd edition)		
Additional Course Information	Laboratory class course.	ses are mandatory	y. Students must co	mplete ALL experiments and laboratory	reports to pass this	

CHEM2541	Introduc	ctory physical chemistry (6 credits)	Academic Year	2017			
Offering Department	Chemistry	у	Quota	200			
Course Co-ordinator	Dr A M Y	Yuen (1st sem); Dr J Y Tang (2nd sem), Chemistry (maiyan@	hku.hk; jinyao@hku.hk)				
Teachers Involved	(Dr A M Y Yuen,Chemistry) (Dr J Y Tang,Chemistry)						
Course Objectives	Students chemical properties	The course aims to provide a rigorous understanding of equilibrium thermodynamics and chemical kinetics Students are required to apply mathematical skills (derivations and integrations) and basic physics to understan chemical reactions and related processes. Topics include the three laws of thermodynamics, thermodynamics properties of mixtures, solutions, chemical equilibrium, electrochemistry, rates of chemical reactions and reaction dynamics. Students will gain a good foundation of knowledge and skills for further study in Physical Chemistry.					
Course Contents & Topics		s of Gases gases and the gas laws with applications.					
	Basic cor	Law of Thermodynamics ncepts of work, heat, energy, expansion work, heat transact in relation to biochemistry and materials science.	ions, enthalpy and adiaba	atic changes an			
		ond and Third Laws of Thermodynamics of spontaneous change, entropy and the Third Law of Thermo	dynamics.				
		ixtures ynamic description of mixtures, partial molar quantities, and solute, regular solutions and ions in solution.	chemical potentials of liq	uids. Activities o			
	Chemical Equilibrium Spontaneous chemical reactions, the Gibbs energy minimum and equilibrium. Response of equilibria to pressure temperature.						
	Electrochemistry Electrochemical cell, relationship of electrochemical potential to thermodynamic functions. Applications of electrochemistry in energy, material science, sensing.						
	Molecules in Motion Molecular motion in gases and liquids, kinetic model, collisions with surfaces, the rate of effusion and transpor properties, conductivities of electrolyte solutions.						
	Empirical	Chemical Reactions chemical kinetics including experimental methods, rates ure dependence of reactions and Reaction mechanism	of reactions, integrated	rate laws and			
Course Learning Outcomes	CLO 1 de	essful completion of this course, students should be able to: emonstrate knowledge and understanding of the properties of f chemical reactions		on and the rate			
	CLO 2 understand and demonstrate knowledge of the three laws of thermodynamics CLO 3 understand and apply the concepts of chemical equilibrium and the response of chemical equilibria to temperature and pressure						
	CLO 4 understand and demonstrate knowledge of electrochemistry and its relationship to thermodynamics, can build electrochemical cell and calculate thermodynamic functions from electrochemical reactions						
	CLO 5 demonstrate knowledge and understanding of basic reaction dynamics including reaction mechanism and how mechanism determines reaction rate law						
Pre-requisites and Co-requisites and Impermissible combinations)	students a	CHEM1042; and NOT for students who have passed CHEM2 admitted in 2014-15 or before); CHEM1042 and CHEM1043; and NOT for students who have se (for students admitted in 2015-16 or thereafter)	•	•			
Offer in 2017 - 2018		t sem 2nd sem Offer in 2018 - 2019 : Y	Examination	Dec May			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show thorough grasp of the subject. Demonstrate strowith ability to apply knowledge to a wide range of complex, familiar and until the complex of the subject.	ledge and skills required for att ong analytical and critical abilities	aining all the cours			
	В	Demonstrate substantial command of a broad range of knowledge and s learning outcomes. Show substantial grasp of the subject. Demonstrate thinking, and ability to apply knowledge to familiar and some unfamiliar situ	kills required for attaining at lease evidence of analytical and critical				
	С	Demonstrate general but incomplete command of knowledge and skills outcomes. Show general but incomplete grasp of the subject. Demonstrat					

		logical thinking, and abilit	ty to apply knowledge to most familia	ar situations.			
	D	Show partial but limited	grasp, with retention of some rele	skills required for attaining some of the covant information, of the subject. Demons d critical abilities. Show limited ability to a	strate evidence of some		
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcome evidence of little or no grasp of the knowledge and understanding of the subject. Lack of analytical and critical ability and coherent thinking. Show very little or no ability to apply knowledge to solve problems.					
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Lectures						
	Tutorials						
	Reading / Self study				100		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents	including tests	30	CLO 1,2,3,4		
	Examina	ntion		70	CLO 1,2,3,4		
Required/recommended reading and online materials	"Physical	'Physical Chemistry" by P. W. Atkins, latest edition					
Additional Course Information	CHEM25	41 will be offered in se	emester 2 only starting from 2	018-19.			

CHEM3141	Enviror	nmental chemist	ry (6 credits)	Academic Ye	ear 2017		
Offering Department	Chemistr	у		Quota	100		
Course Co-ordinator	Dr W T C	Dr W T Chan, Chemistry (wtchan@hku.hk)					
Teachers Involved		Chan, Chemistry)					
	(Prof A S C Cheung, Chemistry)						
Course Objectives			dents to Environmental Chemistry a environmental phenomena and proce		rstand the chemica		
Course Contents & Topics	Atmosphere chemistry: atmospheric composition and behavior, ozone in the stratosphere, chemistry of the troposphere, air pollution Water Chemistry: property of water, water resources and cycle, chemical quality of natural water, acid-base chemistry, oxidation-reduction chemistry, water purification Organic pollutants: persistent organic pollutants, pesticides, toxicology Energy: energy resources, fossil fuels, solar energy, nuclear energy, energy conversion (heat engine, fuel cells) Waste treatment: domestic and hazardous waste treatment (landfill, incineration, air stripping, adsorption, oxidation)						
Course Learning			this course, students should be able to				
Outcomes			dge on chemical principles of the vario				
			al processes of chemistry in atmosp	here, water purification, wa	aste treatment, and		
		energy production					
		,	I and global environmental issues bas				
		117	nalyze chemical processes involved in		blems		
Pre-requisites (and Co-requisites and Impermissible combinations)			//12341 or CHEM2441 or CHEM2442 o				
Offer in 2017 - 2018	Y 2n		18 - 2019 : Y	Examination	,		
Grade Descriptors (A+ to F)	A - Demonstrate thorough grasp of the subject Demonstrate integration of the full range of appropriate theories, principles, and evidence Show evidence of strong analytical abilities, logical and independent thinking, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations Demonstrate highly effective organization and presentation skills.						
	<ul> <li>Demonstrate substantial grasp of the subject Demonstrate general integration of theories, principles, and evidence Show evidence of analytical abilities and logical thinking, some evidence of independent thinking, and ability to apply knowledge to familiar and some unfamiliar situations Demonstrate effective organization and presentation skills.</li> </ul>						
	Demonstrate general but incomplete grasp of the subject Demonstrate some partial integration of theories, principles, and evidence Show evidence of some analytical abilities and logical thinking, little evidence of independent thinking, and ability to apply knowledge to most familiar situations Demonstrate moderately effective organization and presentation skills.						
	D - Demonstrate partial but limited grasp, with retention of some relevant information, of the subject Demonstrate limited integration of theories, principles, and evidence Show evidence of limited analytical abilities, little or no evidence of independent thinking, and limited ability to apply knowledge to solve problems Demonstrate limited or barely effective organization and presentation skills.						
	Fail  - Demonstrate little or no grasp of the knowledge and understanding of the subject Demonstrate little or inapt integration of theories, principles, and evidence Show little or no evidence of analytical abilities, logical and independent thinking, and very little or no ability to apply knowledge to solve problems Demonstrate incoherent organization and poor presentation skills.						
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	s	Details		No. of Hours		
Learning Activities	Lectures	3					
	Tutorials	3			12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents	(continuous assessment)	30	CLO 1,2,3,4		
	Examina	ation		70	CLO 1,2,3,4		
Required/recommended reading and online materials			onmental Chemistry, Freeman, latest eal Chemistry, Lewis Publishers, latest				

CHEM3142	Chemical process industries and analysis (6 credits)	Academic Year	2017
Offering Department	Chemistry	Quota	60

Course Co-ordinator	Prof G K	Y Chan, Chemistry (hrs	sccky@hku.hk)				
Teachers Involved	(Dr V C Y Li,Chemistry) (Dr Y H So,Chemistry)						
Course Objectives		(Visiting Professor,Chemistry) To familiarize with typical chemical industries important in local and global economy. To understand the					
Course Objectives			cturing and chemical processes		ro understand the		
Course Contents			•		Selection of chemica		
& Topics	processe	Process flow charts, units and conversions, materials and energy balances, unit operations. Selection of chemical processes to include variation in products, scale, and types of operation, e.g. for petrochemical industries, industrial gases, beverage processes, chloroalkaline manufacturing.					
Course Learning	On succe	ssful completion of this	course, students should be abl	e to:			
Outcomes	CLO 1	solve basic problems of	energy and mass balances in	chemical and environmental pro	ocesses		
	CLO 2	oe familiarized with a fe	w common chemical industries	and chemical processes			
	CLO 3	understand some gener	ral principles of industrial praction	ce through plant visits			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	Pass in CHEM2041 or CHEM2341 or CHEM2441 or CHEM2541					
Offer in 2017 - 2018	Y 2nd	d sem Offer in 2018 -	2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	attaining all of the course original thought, and abilit	owledge of industrial chemical process learning outcomes. Show strong analy y to apply knowledge to solve problem urcing of references. Apply highly effec	ytical and critical abilities and logical t s in a wide range of complex, familiar	hinking, with evidence of and unfamiliar situations.		
	B Demonstrate substantial knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to solve problems in familiar and some unfamiliar situations. Correct use of data and sourcing of references. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge solve problems to most familiar situations. Mostly correct but some erroneous use of data and references. Apply moderately effective organizational and presentational skills.						
	D	Demonstrate partial but limited knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited ability to use data and source references. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking Show very little or no ability to apply knowledge to solve problems. Misuse of data and references. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture w	ith laboratory compone	ent course				
Course Teaching	Activitie	S	Details		No. of Hours		
Learning Activities	Lectures			24			
	Laborato	ry	computational laboratory		12		
	Field wor	·k	1 - 2 plant visits		12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	continuous assessment	5	CLO 1,2		
	Examina	tion		70	CLO 1,2,3		
	Test		test/quiz	25	CLO 1,2		
Required/recommended reading and conline materials	Felder an	d Rousseau: Elementa	ry Principles of Chemical Proce	sses			
Additional Course	Laborator	v courses are mandate	ory. Students must complete A	LL experiments and laboratory	reports to pass thi		

CHEM3143	Introduc	on to materials chemis	stry (6 credits)	Academic Year	2017		
Offering Department	Chemistry			Quota	100		
Course Co-ordinator	Prof W K Chan, Chemistry (waichan@hku.hk)						
Teachers Involved	Prof W K	ng,Chemistry) chan,Chemistry)					
Course Objectives	This course provides an introduction to materials chemistry. The goal is to present the fundamental knowledge of various types of materials including their structure, synthesis, and properties. This course is essential for students who wish to take advanced materials course.						
Course Contents & Topics	properties;		duction to soft matter; stru	d phase transformation; defect acture, synthesis, and propert aracterization techniques.			
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 describe different materials classification and their composition, structures, and properties, and to apprehend the concept of structure/property relationship						
	CLO 2 explain different structures and phases, phase transformation in solid materials						
	CLO 3 understand defects in crystalline solid materials and relate them with mechanical properties						
	CLO 4 appreciate soft materials and some examples and characteristics						
		erstand the concept of ramerization kinetics to their p	<u> </u>	on in polymers, and explain	n the effect of		
	CLO 6 identify examples of some important materials, and explain their structure-property relationship						
	CLO 7 demonstrate knowledge in materials characterizations						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ch	EM2441; and Pass in CHEM	12541 or CHEM2341				
Offer in 2017 - 2018	Y 1st	em Offer in 2018 - 2019 : \	Y	Examination	Dec		
Grade Descriptors	Α	Demonstrate thorough knowledge of	of assential facts concents princing	ales and theories related to classificati	on of materials. Sho		

(A+ to F)		deep understanding of materials structures at different length scales and the relationship with materials properties particularly in classical solid materials and soft materials. Show extensive knowledge in synthesis, characterization and applications of common polymers. Demonstrate strong ability to apply/integrate knowledge and theory related to the synthesis and application of materials. Show strong ability to analyze novel problems and critical use of data/experimental results to draw appropriate an insightful conclusions related to materials synthesis/characterization.				
	В	· ·				
	С					
	D	classification of materials. S materials properties partic characterization and applic and theory related to the s	mited command of knowledge of ess show deep understanding of materials sularly for classical solid materials at ations of common polymers. Demonstr synthesis and applications of materials ct but erroneous use of data/experiment	structures at different length scales nd soft materials. Show limited k ate evidence but limited ability to a Show limited ability to analyze p	and the relationship with mowledge in synthesis, pply/integrate knowledge roblems to most familiar	
	Fail					
Course Type	Lecture-b	ased course				
Course Teaching	Activities	S	Details	No. of Hours		
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examinat	tion		70	CLO 1,2,3,4,5,6,7	
	Test		(continuous assessment)	30	CLO 1,2,3,4,5,6,7	
Required/recommended reading and online materials	F. W. Billr G. Odian:	meyer: Textbook of Poly Principles of Polymeriza	and Engineering: An Introduction mer Science (John Wiley and Science (John Wiley and Science) ations (John Wiley and Sons, 20 y: An Introduction (Oxford Unive	ons, 1984) (04)		

CHEM3146	Princip techni	Academic Year	2017					
Offering Department	Chemist	try		Quota	200			
Course Co-ordinator	Dr X Li,	Dr X Li, Chemistry (xiangli@hku.hk)						
Teachers Involved								
Course Objectives	is a pre-	requisite for the advanced chem		•	•			
Course Contents & Topics		UV-Visible Absorption Spectroscopy, Nuclear Magnetic Resonance Spectroscopy, Mass Spectrometry, Infra-red Spectroscopy, Elemental Analysis, Molecular Formulas and analysis of data.						
Course Learning	On succ	On successful completion of this course, students should be able to:						
Outcomes	CLO 1	understand the basic principles	and applications of IR, UV/Vis, M	S and NMR spectroscop	ic techniques			
	CLO 2	describe and explain the termino	ology of IR, UV/Vis, MS and NMF	spectroscopies				
	CLO 3	perform chemical structure eluci	dation and analysis based on UV	/Vis, MS and NMR spec	troscopic data			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	any CHEM2XXX level course						
Offer in 2017 - 2018	N C	Offer in 2018 - 2019 : N		Examination				
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations.							
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations.						
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply						
	Fail	Show evidence of some coherent at knowledge to solve problems. Demonstrate little or no evidence of of analytical and critical abilities, log		ical and critical abilities. Show red for attaining the course lea	limited ability to appl			
<b>-</b> -		Show evidence of some coherent at knowledge to solve problems.  Demonstrate little or no evidence of	nd logical thinking, but with limited analyt	ical and critical abilities. Show red for attaining the course lea	limited ability to appl rrning outcomes. Lac dge to solve problems			
Course Teaching		Show evidence of some coherent al knowledge to solve problems. Demonstrate little or no evidence of of analytical and critical abilities, log based course	nd logical thinking, but with limited analyt command of knowledge and skills requi ical and coherent thinking. Show very littl	ical and critical abilities. Show red for attaining the course lea	limited ability to appurning outcomes. Lac dge to solve problem:			
Course Teaching	Lecture- Activiti Lecture	Show evidence of some coherent at knowledge to solve problems.  Demonstrate little or no evidence of of analytical and critical abilities, log based course  Bes Deta S	nd logical thinking, but with limited analyt command of knowledge and skills required and coherent thinking. Show very little	ical and critical abilities. Show red for attaining the course lea	limited ability to appurning outcomes. Lackge to solve problem:  No. of Hours  36			
Course Teaching	Lecture- Activiti Lecture Tutorial	Show evidence of some coherent at knowledge to solve problems.  Demonstrate little or no evidence of of analytical and critical abilities, log based course  Bes Deta S S	nd logical thinking, but with limited analyt command of knowledge and skills required and coherent thinking. Show very little	ical and critical abilities. Show red for attaining the course lea	limited ability to appurning outcomes. Lac ige to solve problems  No. of Hours  36 12			
Course Teaching & Learning Activities	Lecture- Activiti Lecture Tutorial	Show evidence of some coherent at knowledge to solve problems.  Demonstrate little or no evidence of of analytical and critical abilities, log based course  Bes Deta S	nd logical thinking, but with limited analyt command of knowledge and skills required and coherent thinking. Show very little	ical and critical abilities. Show red for attaining the course lea	limited ability to appurning outcomes. Lackge to solve problem:  No. of Hours  36			
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Lecture- Activiti Lecture Tutorial	Show evidence of some coherent at knowledge to solve problems.  Demonstrate little or no evidence of of analytical and critical abilities, log based course  Bes Deta  S  S  g / Self study	nd logical thinking, but with limited analyt command of knowledge and skills requical and coherent thinking. Show very littlist	ical and critical abilities. Show red for attaining the course lea e or no ability to apply knowled Weighting in final course grade (%)	limited ability to appl irning outcomes. Lac ige to solve problems  No. of Hours  36  12			

	Examination		70	CLO 1,2,3
	Test	(2 quizzes)	15	CLO 1,2,3
reading and	Donald L. Pavia, Gary M. Lampma 4th edition) W. Kemp: Organic Spectroscopy (I	,	Spectroscopy (Thomson Le	arning, 2001, 3rd &
Additional Course Information	Suggested follow-up course: CHE	M3241		

	Analytica	al chemistry II: che	emical instrumentation (6 credit	s) Academic Ye	ar 2017			
Offering Department	Chemistry		,	Quota	80			
Course Co-ordinator	Dr W T Ch	an, Chemistry (wtchar	n@hku.hk)		'			
Teachers Involved		Dr I K Chu,Chemistry) Dr W T Chan,Chemistry)						
Course Objectives			d applications of chemical instrument iciples, of instruments that are common					
Course Contents			UV-visible, infrared, and atomic s	-				
& Topics	Separation chromatog Mass spec	spectrometry; grating spectrometer; photon detectors and thermal detectors.  Separation methods: partition; chromatography theories; high performance liquid chromatography (HPLC) and garchromatography (GC); instrumental set up of HPLC and GC.  Mass spectrometry: fundamental concept of mass spectrometry; electrospray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI); time-of-flight (TOF) and quadrupole (Q) mass analyzers.						
Course Learning	On succes	sful completion of this	course, students should be able to:					
Outcomes	CLO 1 ex	plain the principles of t	he optical methods, separation method	ds, and mass spectrome	etry			
		scribe the basic experi the laboratory classes	mental set up and the properties of the	basic components of the	ne instruments use			
			in chemical analysis including sample and matrix effects correction (standard a		solution preparatio			
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in Ch	HEM2241						
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2	2019 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	Demonstrate thorough grasp of the subject Show evidence of strong analytical abilities, logical and independent thinking, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations Demonstrate highly proficient lab skills and techniques and critical use of data and results to draw appropriate and insightful conclusions Demonstrate highly effective and properties and properties and properties and properties.							
	organization and presentation skills  - Demonstrate substantial grasp of the subject Show evidence of analytical abilities and logical thinking, some evidence of independent thinking, and ability to apply knowledge to familiar and some unfamiliar situations Demonstrate proficient lab skills and techniques and correct use of data and results to draw appropriate conclusions Demonstrate effective organization and presentation skills.							
	Demonstrate general but incomplete grasp of the subject Show evidence of some analytical abilities and logical thinking, little evidence of independent thinking, and ability to apply knowledge to most familiar situations Demonstrate adequate lab skills and techniques and mostly correct but some erroneous use of data and results to draw appropriate conclusions Demonstrate moderately effective organization and presentation skills.							
				could to draw appropriate cor	nclusions Demonstra			
	D	moderately effective organ - Demonstrate partial but analytical abilities, little or Demonstrate partially effe conclusions Demonstrate	ization and presentation skills. limited grasp, with retention of some relevant ir no evidence of independent thinking, and lim active lab skills and techniques and limited a elimited or barely effective organization and presentation.	nformation, of the subject S nited ability to apply knowled ability to use data and resu sentation skills.	Show evidence of limit ge to solve problems lts to draw appropria			
	Fail	moderately effective organ  - Demonstrate partial but in analytical abilities, little or Demonstrate partially effectonclusions Demonstrate  - Demonstrate little or no abilities, logical and indep minimally effective or inefficonclusions Demonstrate	ization and presentation skills. limited grasp, with retention of some relevant ir no evidence of independent thinking, and lim active lab skills and techniques and limited a limited or barely effective organization and pre- grasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation	nformation, of the subject S nited ability to apply knowled ability to use data and resu sentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una	Show evidence of limit ge to solve problems lts to draw appropria no evidence of analytic problems Demonstra			
	Fail Lecture wi	moderately effective organ  - Demonstrate partial but in analytical abilities, little or Demonstrate partially effectonclusions Demonstrate  - Demonstrate little or no abilities, logical and indep minimally effective or inefficonclusions Demonstrate th laboratory compone	ization and presentation skills. limited grasp, with retention of some relevant in no evidence of independent thinking, and lim active lab skills and techniques and limited as a limited or barely effective organization and pre- grasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation nt course	nformation, of the subject S nited ability to apply knowled ability to use data and resu sentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una	Show evidence of limit ge to solve problems lts to draw appropria no evidence of analytic roblems Demonstra able to draw appropria			
ourse Teaching	Fail Lecture wi	moderately effective organ  - Demonstrate partial but in analytical abilities, little or Demonstrate partially effectonclusions Demonstrate  - Demonstrate little or no abilities, logical and indep minimally effective or inefficonclusions Demonstrate th laboratory compone	ization and presentation skills. limited grasp, with retention of some relevant ir no evidence of independent thinking, and lim active lab skills and techniques and limited a limited or barely effective organization and pre- grasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation	nformation, of the subject S nited ability to apply knowled ability to use data and resu sentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una	Show evidence of limit ge to solve problems lts to draw appropria no evidence of analytic roblems Demonstra able to draw appropria			
ourse Teaching	Fail Lecture wire Activities Lectures	moderately effective organ  - Demonstrate partial but in analytical abilities, little or Demonstrate partially effectonclusions Demonstrate  - Demonstrate little or no abilities, logical and indep minimally effective or inefficonclusions Demonstrate th laboratory compone	ization and presentation skills. limited grasp, with retention of some relevant in no evidence of independent thinking, and lim active lab skills and techniques and limited as a limited or barely effective organization and pre- grasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation nt course	nformation, of the subject S nited ability to apply knowled ability to use data and resu sentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una	Show evidence of limit ge to solve problems lts to draw appropria no evidence of analytic problems Demonstra able to draw appropria			
ourse Teaching	Fail  Lecture wire  Activities  Lectures  Laboratory	moderately effective organ  - Demonstrate partial but in analytical abilities, little or Demonstrate partially effectonclusions Demonstrate  - Demonstrate little or no abilities, logical and indep minimally effective or inefficonclusions Demonstrate th laboratory compone	ization and presentation skills. limited grasp, with retention of some relevant in no evidence of independent thinking, and lim active lab skills and techniques and limited as a limited or barely effective organization and pre- grasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation nt course	nformation, of the subject S nited ability to apply knowled ability to use data and resu sentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una	Show evidence of limit ge to solve problems lts to draw appropria to evidence of analytic roblems Demonstrable to draw appropria  No. of Hours  24  28			
ourse Teaching	Fail  Lecture wi Activities Lectures Laborator Tutorials	moderately effective organ  - Demonstrate partial blut of analytical abilities, little or Demonstrate partially effective onclusions Demonstrate - Demonstrate ittle or no abilities, logical and indepminimally effective or inefective or inefective or inclusions Demonstrate onclusions Demonstrate	ization and presentation skills. limited grasp, with retention of some relevant in no evidence of independent thinking, and lim active lab skills and techniques and limited as a limited or barely effective organization and pre- grasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation nt course	nformation, of the subject S nited ability to apply knowled ability to use data and resu sentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una	Show evidence of limit ge to solve problems lts to draw appropria or evidence of analytic roblems Demonstrable to draw appropria  No. of Hours  24  28  12			
ourse Teaching	Fail  Lecture wi Activities Lectures Laborator Tutorials	moderately effective organ  - Demonstrate partial but in analytical abilities, little or Demonstrate partially effectonclusions Demonstrate  - Demonstrate little or no abilities, logical and indep minimally effective or inefficonclusions Demonstrate th laboratory compone	ization and presentation skills. limited grasp, with retention of some relevant in no evidence of independent thinking, and lim active lab skills and techniques and limited as a limited or barely effective organization and pre- grasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation nt course	nformation, of the subject S nited ability to apply knowled ability to use data and resu sentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una	Show evidence of limit ge to solve problems lts to draw appropria to evidence of analytic roblems Demonstrable to draw appropria  No. of Hours  24  28			
course Teaching Learning Activities	Fail  Lecture wi Activities Lectures Laborator Tutorials	moderately effective organ  - Demonstrate partial blut of analytical abilities, little or Demonstrate partially effective onclusions Demonstrate - Demonstrate ittle or no abilities, logical and indepminimally effective or inefective or inefective or inclusions Demonstrate onclusions Demonstrate	ization and presentation skills. limited grasp, with retention of some relevant in no evidence of independent thinking, and lim active lab skills and techniques and limited as a limited or barely effective organization and pre- grasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation nt course	nformation, of the subject S nited ability to apply knowled ability to use data and resu sentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una	Show evidence of limit ge to solve problems lts to draw appropria or evidence of analytic roblems Demonstrable to draw appropria  No. of Hours  24  28  12			
ourse Teaching Learning Activities	Fail  Lecture wi Activities Lectures Laborator, Tutorials Reading /	moderately effective organ  - Demonstrate partial but analytical abilities, little Demonstrate partially effe conclusions Demonstrate - Demonstrate little or no abilities, logical and indep minimally effective or inefi conclusions Demonstrate th laboratory compone  y  Self study	ization and presentation skills.  limited grasp, with retention of some relevant ir no evidence of independent thinking, and limited limited or barely effective organization and present of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation int course    Details	nformation, of the subject S inted ability to apply knowled ability to use data and resusentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una skills.  Weighting in final	Show evidence of limit ge to solve problems lts to draw appropria to evidence of analytic roblems Demonstrable to draw appropria  No. of Hours  24  28  12  100  Assessment Methods			
course Teaching Learning Activities	Fail  Lecture wire Activities Lectures Laboratory Tutorials Reading / Methods	moderately effective organ  - Demonstrate partial but analytical abilities, little or Demonstrate partially effeconclusions Demonstrate - Demonstrate little or no abilities, logical and indep minimally effective or ineff conclusions Demonstrate th laboratory compone  y  Self study	ization and presentation skills.  limited grasp, with retention of some relevant ir no evidence of independent thinking, and limited limited or barely effective organization and present of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation int course    Details	nformation, of the subject S inited ability to apply knowled ability to use data and resu sentation skills.  The subject Show little or n apply knowledge to solve p f data and results and/or una skills.  Weighting in final course grade (%)	Show evidence of limit ge to solve problems lts to draw appropria to evidence of analytic roblems Demonstrable to draw appropria  No. of Hours  24  28  12  100  Assessment Methods to CLO Mappin			
Course Teaching Learning Activities Assessment Methods	Fail  Lecture wire  Activities Lectures Laborator Tutorials Reading / Methods  Examinati	moderately effective organ  - Demonstrate partial but analytical abilities, little or Demonstrate partially effeconclusions Demonstrate - Demonstrate little or no abilities, logical and indep minimally effective or ineff conclusions Demonstrate th laboratory compone  y  Self study	ization and presentation skills.  limited grasp, with retention of some relevant ir no evidence of independent thinking, and limited limited skills and techniques and limited a limited or barely effective organization and pregrasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation nt course  Details  Details	nformation, of the subject Sited ability to apply knowled ability to use data and resusentation skills. The subject Show little or napply knowledge to solve pf data and results and/or unaskills.  Weighting in final course grade (%)	Show evidence of limit ge to solve problems lts to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria to evidence of analytic roblems Demonstrable to draw appropria			
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  Lecture wire Activities Lectures Laborator Tutorials Reading / Methods  Examinati Laborator Test D.A. Skood D.A. Skood	moderately effective organ  - Demonstrate partial but analytical abilities, little or Demonstrate partially effeconclusions Demonstrate - Demonstrate little or no abilities, logical and indep minimally effective or inefe conclusions Demonstrate th laboratory compone	ization and presentation skills.  limited grasp, with retention of some relevant ir no evidence of independent thinking, and limited limited skills and techniques and limited a limited or barely effective organization and pregrasp of the knowledge and understanding of bendent thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation nt course  Details  Details	nformation, of the subject S inited ability to apply knowled ability to use data and resu sentation skills. the subject Show little or n apply knowledge to solve p f data and results and/or una skills.  Weighting in final course grade (%)  65 25 10 is (Thomson, latest editi	Show evidence of limit ge to solve problems its to draw appropria or evidence of analytic roblems Demonstrable to draw appropria  No. of Hours  24  28  12  100  Assessment Methods to CLO Mappir  CLO 1,2,3  CLO 1,2,3  On).			
Course Teaching Learning Activities Assessment Methods and Weighting	Fail  Lecture wire Activities Lectures Laborator Tutorials Reading / Methods  Examinati Laborator Test D.A. Skooledition)	moderately effective organ  - Demonstrate partial but analytical abilities, little or Demonstrate partially effeconclusions Demonstrate - Demonstrate partially effeconclusions Demonstrate ititle or no abilities, logical and indep minimally effective or inefeconclusions Demonstrate th laboratory compone  s  y  Self study  on y reports  g, F.K. Holler, S.R. Cro g, D.M. West, F.J. Ho	ization and presentation skills.  limited grasp, with retention of some relevant ir no evidence of independent thinking, and limited limited or barely effective organization and presented thinking, and techniques and limited as limited or barely effective organization and presented thinking, and very little or no ability to fective lab skills and techniques and misuse of a incoherent organization and poor presentation int course    Details     De	mformation, of the subject Sited ability to apply knowled ability to use data and resusentation skills. The subject Show little or mapply knowledge to solve pf data and results and/or una skills.  Weighting in final course grade (%)  65 25 10 is (Thomson, latest edition of the subject of Analytical Chemist	Show evidence of limit ge to solve problems lts to draw appropria or evidence of analytic roblems Demonstrable to draw appropria  No. of Hours  24  28  12  100  Assessment Methods to CLO Mappir  CLO 1,2,3  CLO 1,2,3  On).  ry (Thomson, late			

CHEM3242	Food and water analysis (6 credits)	Academic Year	2017		
Offering Department	Chemistry	Quota	50		
Course Co-ordinator	Dr K M Ng, Chemistry (kwanmng@hku.hk)				
Teachers Involved	(Dr K M Ng,Chemistry)				
Course Objectives	To cover areas in the application and new methodology development in analytic water analysis.	al chemistry with f	ocus on food and		
Course Contents & Topics	Chemical Analysis in Practicing Laboratories: Use of standard methods, guid water analysis; good laboratory practice; reliability and quality issues in chemical		rds for food and		
	Food Analysis: Requirement of nutritional labeling; determination of food nutritional value (e.g. total pro sodium content); detection of food adulteration and contamination (e.g. presence of banned additional undeclared components); recent issues and case studies in food analysis.				

	Water Analysis: Water quality standards; sampling, pretreatment, storage of water samples; theory and technologies for field, laboratory and automated analysis of selected types of water (e.g. drinking water,					
	Analytical phase ex	traction) and instrumenta	Selection, application and comb al (e.g. GC, LC, MS) technique: f certified reference materials)			
Course Learning	` •		course, students should be able	to.		
Outcomes	CLO 1		errors and uncertainty of analytic			
	CLO 2	•	control quality and ensure relia			
	CLO 3		knowledge in food and water and			
	CLO 4	-	blic health protection related to	•		
	CLO 5		niques used in practicing food a	•		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C		1 or CHEM2341 or CHEM2441 o			
Offer in 2017 - 2018	Y 2nd	d sem Offer in 2018 - 2	019 : Y	Examination	May	
Grade Descriptors (A+ to F)	Α	analysis to acquire accurat outcomes. Show strong ana	rough grasp of the knowledge and skill the results with full interpretation for an allytical and critical abilities, logical thinkind problems related to the analysis of in class work.	alytical application as described in ing and capability to apply knowledge	all the course learning ge learnt to solve a wide	
	Demonstrate a substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to the analysis of food and water. Apply effective organization and presentation skills as shown in class work.					
	Demonstrate a general command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and ability to apply knowledge learnt to solve a wide range of complex issues and problems related to the analysis of food and water. Apply effective organization and presentation skills as shown in class work.					
	D	Demonstrate a partial but limited command of knowledge and skills required for attaining some of the course learning outcomes in Food and Water Analysis. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems related to the analysis of food and water. Apply limited or barely effective organization and presentation skill as shown in class work.				
	Fail  Demonstrate little or no evidence for the command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems related to the analysis of food and water. Organization and presentation skills are minimally effective or ineffective as shown in class work.					
Course Type	Lecture w	ith laboratory componen	t course			
Course Teaching	Activitie	s	Details	No. of Hours		
& Learning Activities	Lectures				24	
	Laborato	ry			24	
	Tutorials				8	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		5	CLO 1,2,3,4	
	Examina	tion		70	CLO 1,2,3,4	
	Laboratory reports		Experiment & Lab report	15	CLO 2,5	
	Test	D. M. 147 . F		10	CLO 1,2,3,4	
Required/recommended reading and online materials	D. A. Sko latest edit		Holler, S.R. Crouch: Fundament	tals of Analytical Chemistry (	Cengage Learning,	
Additional Course	Reference	es to specialist texts and	other published material will be	made throughout the course		
Information			y. Students must complete ALL			

CHEM3243	Introductory instrumental chemical analysis (6 credits)	Academic Year	2017				
Offering Department	Chemistry	Quota	65				
Course Co-ordinator	Dr X Li, Chemistry (xiangli@hku.hk)						
Teachers Involved	(Dr K C J Wong,Pharmacology and Pharmacy) (Dr X Li,Chemistry)						
Course Objectives	This course is designed for non-chemistry major students covering basic principles of separation and spectroscopy for chemical analysis. This course provides a general foundation for further studies in pharmacology, life and environmental sciences.						
Course Contents & Topics	Optical methods: Beer's Law; UV-visible, infrared, and atomic spectrometry; fluorescence; atomic mass spectrometry; grating spectrometer; photon detectors and thermal detectors.  Separation methods: partition; chromatography theories; high performance liquid chromatography (HPLC) and gas chromatography (GC); instrumental set up of HPLC and GC.  Mass spectrometry: fundamental concept of mass spectrometry; electrospray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI); time-of-flight (TOF) and quadrupole (Q) mass analyzers.  NMR: basic principle of nuclear magnetic resonance.  Analysis and quality assurance: statistical analysis of small sets of data, control chart.						
Course Learning	On successful completion of this course, students should be able to:		LAIME				
Outcomes	CLO 1 explain the principles of the optical methods, separation methods, mass spectrometry, and NMR CLO 2 describe the basic experimental set up and the properties of the basic components of the instruments use in the laboratory classes						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM2041 or CHEM2241; and Not for students who have passed CHEM3241, or have already enrolled in this course.						

Offer in 2017 - 2018	Y 2n	d sem Offer in 2018 -	- 2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	ablility to apply knowledge and techniques and critic organization and presenta	e to a wide range of complex, far al use of data and results to drav ation skills.	ence of strong analytical abilities, logical and i niliar and unfamiliar situations Demonstrate v appropriate and insightful conclusions Der	highly proficient lab skills nonstrate highly effective	
	В	independent thinking, and	d ability to apply knowledge to far	evidence of analytical abilities and logical thi miliar and some unfamiliar situations Demor aw appropriate conclusions Demonstrate e	strate proficient lab skills	
	С	evidence of independent and techniques and most	thinking, and ability to apply known	<ul> <li>t Show evidence of some analytical abilities owledge to most familiar situations Demons se of data and results to draw appropriate co</li> </ul>	strate adequate lab skills	
	D	analytical abilities, little of Demonstrate partially ef	or no evidence of independent	some relevant information, of the subject \$ thinking, and limited ability to apply knowlec is and limited ability to use data and resunization and presentation skills.	lge to solve problems	
	Fail					
Course Type	Lecture w	vith laboratory compone	ent course	·		
Course Teaching	Activitie	S	Details	Details		
& Learning Activities	Lectures				24	
	Laborato	ry		28		
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	<b>S</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	tion		70	CLO 1,2	
	Laborato	ry reports		15	CLO 1,2	
	Test			15	CLO 1,2	
Required/recommended	D.A. Sko	A. Skoog, F.K. Holler, S.R. Crouch: Principles of Instrumental Analysis (Thomson, latest edition)			ion).	
reading and online materials	D.A. Sko edition)	og, D.M. West, F.J. H	Holler, and S.R. Crouch: I	Fundamentals of Analytical Chemist	ry (Thomson, latest	
Additional Course	Laborato	ry classes are mandate	ory. Students must compl	ete ALL experiments and laboratory	reports to pass this	
Information	course.	rse.				

CHEM3244	Analytical te	echniques for pharmacy students	(6 credits)	Academic Year	2017	
Offering Department	Chemistry	<u> </u>		Quota	35	
Course Co-ordinator	Dr X Li, Chemi	stry (xiangli@hku.hk)				
Teachers Involved	(Dr K C J Won (Dr X Li,Chemi	g,Pharmacology and Pharmacy) stry)				
Course Objectives		designed for Bachelor of Pharmacy stutechniques that are important to pharmaco	•		nt analytical and	
Course Contents & Topics		Applications of different analytical and me and pharmacokinetics studies	easurement techniques	in pharmaceutical	sciences such as	
	Analysis and q	uality assurance: statistical analysis of dat	ta, control chart.			
		Optical methods: Beer's Law; instrum UV-visible, infrared, and atomic; emission		ectrometer, detect	ors; absorption	
		ation and Purification: partition; chromato is chromatography (GC); instrumentation o		performance liquid	chromatography	
	Molecular Mass Measurements: mass spectrometry-fundamental concepts; various ionization techniques including electrospray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI); time-of-flight (TOF) and quadrupole (Q) mass analyzers; use of mass spectrometry in drug analysis					
	Nuclear magnetic resonance: basic principles; instrumentations; applications in structure determination of molecules of biological and pharmaceutical importance					
Course Learning		completion of this course, students should	d be able to:			
Outcomes	CLO 1 demonstrate knowledge and understanding of the principles of different optical methods, separation methods, mass spectrometry, NMR spectroscopy and their applications in pharmaceutical sciences  CLO 2 describe the basic experimental set up and the properties of the basic components of the instruments used					
	in the laboratory classes					
	CLO 3 apply experimental skills in chemical analysis including sample preparation, standard solution preparation, instrument calibration, matrix effects correction (standard additions)					
Pre-requisites	Pass in BPHM		,			
(and Co-requisites and Impermissible combinations)	(This course is	for BPharm students only)				
Offer in 2017 - 2018	Y 2nd sem	Offer in 2018 - 2019 : Y		Examination	May	
Grade Descriptors (A+ to F)	ablil and	- Demonstrate thorough grasp of the subject Show evidence of strong analytical abilities, logical and independent thinking, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations Demonstrate highly proficient lab skills and techniques and critical use of data and results to draw appropriate and insightful conclusions Demonstrate highly effective organization and presentation skills.				
	B - Demonstrate substantial grasp of the subject Show evidence of analytical abilities and logical thinking, some evidence of independent thinking, and ability to apply knowledge to familiar and some unfamiliar situations Demonstrate proficient lab skills and techniques and correct use of data and results to draw appropriate conclusions Demonstrate effective organization and presentation skills.					
	presentation skills.  C - Demonstrate general but incomplete grasp of the subject Show evidence of some analytical abilities and logical thinking, little evidence of independent thinking, and ability to apply knowledge to most familiar situations Demonstrate adequate lab skills and techniques and mostly correct but some erroneous use of data and results to draw appropriate conclusions Demonstrate moderately effective organization and presentation skills.					

	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject Show evidence of analytical abilities, little or no evidence of independent thinking, and limited ability to apply knowledge to solve problem bemonstrate partially effective lab skills and techniques and limited ability to use data and results to draw approximate Demonstrate limited or barely effective organization and presentation skills.  - Demonstrate little or no grasp of the knowledge and understanding of the subject Show little or no evidence of an abilities, logical and independent thinking, and very little or no ability to apply knowledge to solve problems Demonimally effective or ineffective lab skills and techniques and misuse of data and results and/or unable to draw appropriate incoherent organization and poor presentation skills.					
Course Type	Lecture with laboratory compone					
Course Teaching & Learning Activities	Activities	Details		No. of Hours		
	Lectures			24		
	Laboratory			28		
	Reading / Self study			100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination		70	CLO 1,2,3		
	Laboratory reports		15	CLO 1,2,3		
	Test		15	CLO 1,2,3		
Required/recommended reading and online materials Additional Course Information	D.A. Skoog, F.K. Holler, S.R. Crouch: Principles of Instrumental Analysis (Thomson, latest edition). D.A. Skoog, D.M. West, F.J. Holler, and S.R. Crouch: Fundamentals of Analytical Chemistry (Thomson, latest edition). This course is for Pharmacy students ONLY. Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.					

CHEM3341		ic chemistry II (6 credits)	Academic Year 2					
Offering Department	Chemistr	,	Quota 9	90				
Course Co-ordinator		W Yam, Chemistry (wwyam@hku.hk)						
Teachers Involved	,	/ Yuen,Chemistry) / W Yam,Chemistry)						
Course Objectives	inorganic	rse is a continuation from CHEM2341 Inorganic Chemistry chemistry, with examples relevance to biological processe ending to extend their studies in chemistry.						
Course Contents & Topics	their read	Chemistry of selected classes of inorganic, coordination and organometallic compounds including mechal their reaction where appropriate.						
	systems.	, bonding, magnetism and spectral properties of inorganic	systems including examples	in bioinorgani				
Course Learning	On succe	essful completion of this course, students should be able to:						
Outcomes	C	emonstrate knowledge of chemistry of selected classes compounds		organometallio				
	CLO 3 u	nderstand structure, bonding, magnetism and spectral proportion of selected chemical reactions rganometallic compounds	s that are essential to cool	rdination and				
Pre-requisites and Co-requisites and Impermissible	-	CLO 4 gain appropriate knowledge of coordination compounds in biological systems  Pass in CHEM2341						
combinations)		0% : 0040 0040 1/	<u> </u>					
Offer in 2017 - 2018 Grade Descriptors	Y 1st	t sem Offer in 2018 - 2019 : Y  Demonstrate thorough knowledge and understanding of essential facts		Dec				
		systems including examples in bioinorganic systems. Show strong abilifithe more advanced foundation knowledge of inorganic chemistry. Show of data and experimental results to draw appropriate and insightful or foundation principles and knowledge of inorganic chemistry. Demon especially in the synthesis and reactivity study of inorganic compour various spectroscopic methods.	v strong ability to analyze novel proble onclusions relating to the essential ar strate highly effective laboratory skills	ms and critical use nd more advanced s and techniques				
	В	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relati to the more advanced foundation knowledge of inorganic chemistry, especially those related to structure and bonding inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties inorganic systems including examples in bioinorganic systems. Show evidence to apply and integrate knowledge and theo relating to the more advanced foundation knowledge of inorganic chemistry. Show evidence to analyze novel problems are correct use of data and experimental results to draw appropriate conclusions relating to the essential and more advance foundation principles and knowledge of inorganic chemistry. Demonstrate effective laboratory skills and techniques, especially the synthesis and reactivity study of inorganic compounds and metal complexes, and their characterization by variou spectroscopic methods.						
	С	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principl theories relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to struct bonding of inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and properties of inorganic systems including examples in bioinorganic systems. Show evidence of some abilities to ap integrate knowledge and theory relating to the more advanced foundation knowledge of inorganic chemistry. Show a analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results appropriate conclusions relating to the essential and more advanced foundation principles and knowledge of inorganic chemistry. Demonstrate moderately effective laboratory skills and techniques, especially in the synthesis and reactivity study of ir						
	D	relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to structure and bonding inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties inorganic systems including examples in bioinorganic systems. Show evidence of limited abilities to apply and integral knowledge and theory relating to the more advanced foundation knowledge of inorganic chemistry. Show limited ability analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to dra appropriate conclusions relating to the essential and more advanced foundation principles and knowledge of inorganic chemist Demonstrate partially effective laboratory skills and techniques, especially in the synthesis and reactivity study of inorganic						
		compounds and metal complexes, and their characterization by various						

Course Type	properties of inorganic sys integrate knowledge and it ability to analyze problems conclusions relating to the Demonstrate minimally eff	ordination and organometallic compounds tems including examples in bioinorganics in heory relating to the more advanced found to most familiar situations and erroneous ne essential and more advanced founda ective laboratory skills and techniques, est plexes, and their characterization by variound the course.	ystems. Show little or no evidence dation knowledge of inorganic che a use of data and experimental re ation principles and knowledge specially in the synthesis and rea	e of abilities to apply and emistry. Show little or no sults to draw appropriate of inorganic chemistry.			
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Lectures	2000		24			
	Laboratory			24			
	Tutorials			6			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments	including lab report & test	30	CLO 1,2,3,4			
	Examination		70	CLO 1,2,3,4			
Required/recommended reading and online materials		Shriver & Atkins, Inorganic Chemistry (4th Ed.), Oxford University Press, 2005 Catherine, Housecroft & Sharpe, Inorganic Chemistry (3nd Ed.), Prentice Hall, 2008					
Additional Course Information	Laboratory classes are mandato course.	boratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this urse.					

CHEM3342	Bioinorg	Bioinorganic chemistry (6 credits)  Academic Year 2017					
Offering Department	Chemistry	Chemistry Quota 50					
Course Co-ordinator	Prof H Z S	un, Chemistry (hsun@hku.hk)					
Teachers Involved	,	ı Yeung,Chemistry) Sun,Chemistry)					
Course Objectives	details of i	e is a continuation from Basic Inorganic Chemistry and Basic Organic C norganic chemistry in biological system, with examples relevance to buited to the needs of those intending to extend their studies in (bio)chem	piological proces	ses and medica			
Course Contents & Topics	behind the mechanism	Bioinorganic Chemistry of selected topics of interest. Examples include the inorganic chemistry (and biochemistry) behind the requirement of biological cells for metals such as zinc, iron and copper; and metals in medicine such as mechanisms by which organisms obtain required metal ions from their environment, and use of metal-containing compounds in treating diseases such as cancer.					
Course Learning		sful completion of this course, students should be able to:					
Outcomes		derstand the principles and concepts of inorganic/organic chemistry in b					
		derstand structure, bonding, and spectral properties of selected metals					
		derstand chemical mechanisms of selected metal homeostasis (i.e. upta	ake, transport ar	id storage)			
		derstand the role of metal complexes medicine					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ch						
Offer in 2017 - 2018	Y 2nd		xamination	May			
Grade Descriptors (A+ to F)	В	Demonstrate thorough knowledge and understanding of essential facts, concepts, prin foundation knowledge of bioinorganic chemistry, especially those related to hard-soft a bonding of metals in biological systems; thermodynamic and kinetic aspects of meta relevance to metal homeostasis; metal-based drugs. Show strong ability to apply and in the basic foundation knowledge of bioinorganic chemistry. Show strong ability to analyz and experimental results to draw appropriate and insightful conclusions relating to bioinorganic chemistry. Demonstrate highly effective basic techniques, especially in the and overall metallo-biomolecules.  Demonstrate substantial command of knowledge and understanding of essential facts, or to the basic foundation knowledge of bioinorganic chemistry, especially those related	cid-base theory; che il ions in biological itegrate knowledge a e novel problems an the basic principles e characterization of concepts, principles,	elation; structure and processes and their and theory relating to did critical use of data and knowledge of inorganic active site and theories relating and theories relating			
		to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processe and their relevance to metal homeostasis; metal-based drugs. Show evidence to apply and integrate knowledge and theor relating to the basic foundation knowledge of bioinorganic chemistry. Show evidence to analyze novel problems and correct us of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of bioinorgan chemistry. Demonstrate effective basic techniques, especially in the characterization of inorganic active site and overall metal biomolecules.					
	С	Demonstrate general but incomplete command of knowledge and understanding of e theories relating to the basic foundation knowledge of bioinorganic chemistry, especia theory; chelation; structure and bonding of metals in biological systems; thermodynar biological processes and their relevance to metal homeostasis; metal-based drugs. Show integrate knowledge and theory relating to the basic foundation knowledge of bioinorg problems to most familiar situations and mostly correct but erroneous use of data and conclusions relating to the basic principles and knowledge of bioinorganic chemistry. techniques, especially in the characterization of inorganic active site and overall metallo-	ally those related to nic and kinetic aspe w evidence of some ganic chemistry. Sho experimental results Demonstrate moder	hard-soft acid-base ects of metal ions in abilities to apply and ow ability to analyze to draw appropriate			
	D						
	Fail  Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show little or no ability to analyze problems to most familiar situations and erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate minimally effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.						
Course Type	Lecture-ba	sed course					
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Lectures			36			

	Tutorials	including literature survey & present	tation	12			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments	(continuous assessment of assignments and presentation)	25	CLO 1,2,3,4			
	Examination		75	CLO 1,2,3,4			
Required/recommended reading and online materials	Bertini, I.; Gray, H. B.; Stiefel, E	Lippard, S. J. and Berg, J. M. Principles of Bioinorganic Chemistry (University Science Books; Mill Valley, CA, 1994 Bertini, I.; Gray, H. B.; Stiefel, E. I.; Valentine, J. S., editors. Biological Inorganic Chemistry: Structure and Reactivity, University Science Books, 2007					
Additional Course Information		letals and Life, Moore C., RSC Publishing, 2010. ioinorganic Chemistry: Inorganic Elements in the Chemistry of Life, Kaim W. & Schwederski B., John Wiley &					

CHEM3441	Organic	chemistry II (6 cre	edits)	Academic Ye	ar 2017					
Offering Department	Chemistry	Chemistry Quota								
Course Co-ordinator	Dr X Y Li (	1st sem); Prof D Yang	g (2nd sem), Chemistry (xiaoyuli@hku	ı.hk; yangdan@hku.hk)						
Teachers Involved		nemistry) Chemistry) ng,Chemistry)								
Course Objectives	chemistry	together with CHEM2	441 Organic Chemistry I, this course 2441. It focuses primarily on the bas with examples illustrating the role of o	ic principles to understan	d the structure and					
Course Contents & Topics	Chemistry amines; ar	of common organic romatic compounds.	functional groups: ketones and alder Principles of organic synthesis. Deta , NMR, and MS) for characterization a	nydes; carboxylic acids a liled considerations of rea	nd their derivatives action mechanisms					
Course Learning	On succes	sful completion of this	s course, students should be able to:							
Outcomes	CLO 1 dra	aw correct structural r	epresentations of organic molecules							
	CLO 2 un	derstand the basic pr	inciples of structure and reactivity of o	rganic molecules						
	CLO 3 de	termine structures of	organic compounds based on spectro	scopic data						
	co		nisms for transformations of common, ketones, carboxylic acids, acyl halid	0 1 1						
	CLO 5 ap	preciate the importan	ce of organic chemistry in daily life							
	CLO 6 de	vise synthetic pathwa	lys to organic compounds using function	onal group chemistry						
Pre-requisites (and Co-requisites and Impermissible combinations)	students v	CHEM3441 has be who admitted in 2014	en changed to lecture-based course 4-15 or before, they must enroll also to meet the Chemistry Major requirem	CHEM3443 for enrolling						
Offer in 2017 - 2018		sem 2nd sem Offe	, , ,	Examination	Dec May					
Grade Descriptors (A+ to F)	A	learning outcomes. Show	nastery at an advanced level of extensive known strong analytical and critical abilities and logic vide range of complex, familiar and unfamiliar si	cal thinking, with evidence of original	attaining all the course					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations.								
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations.								
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.								
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lact of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems									
Course Type	Lecture-ba	sed course								
Course Teaching	Activities		Details		No. of Hours					
& Learning Activities	Lectures				36					
	Tutorials				12					
	Reading /	Self study			100					
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping					
	Examinati	on	1 x 3 hr written examination	70	CLO 1,2,3,4,5,6					
		<del></del>		30						
Required/recommended reading and online materials	"Organic				Test Test and assignments 30 CLO 1,2,3,4,5,6 "Organic Chemistry", by Paula Y. Bruice, 2014, 7th Edition, Pearson, with e-text and Mastering Chemistry. Chapters 14-20.					

CHEM3442	Organi	c chemistry of biomolecules (6 credits)	Academic Year	2017			
Offering Department	Chemistr	ry .	Quota	50			
Course Co-ordinator	Dr P H T	oy, Chemistry (phtoy@hku.hk)					
Teachers Involved	(Dr P H	Toy,Chemistry)					
Course Objectives	The major objective of this course is to give the students an understanding and appreciation of the role of organic chemistry in biology and biochemistry.						
Course Contents & Topics		The chemistry of organic molecule groups such as carbohydrates, amino acids, peptides, coenzymes, nucleotides and lipids will discussed. Enzyme catalysis, cofactors and inhibitors will also be presented.					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 have a basic understanding of biologically important organic molecules						
	CLO 2 have a basic understanding of enzyme catalysis						

	CLO 3	appreciate how organic	chemistry plays an import	tant role in biology and biochemistry	1	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM2442 or CHEM2443 or CHEM3441					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2	019 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	for attaining all the course	learning outcomes. Show strong to apply knowledge to a wide	tensive biomolecule organic chemistry know g analytical and critical abilities and logical e range of complex, familiar and unfamilia	hinking, with evidence of	
	В	attaining at least most of th	e course learning outcomes. She	c chemistry with a broad range of knowledgow ow evidence of analytical and critical abilities roblems. Apply effective organizational and p	and logical thinking, and	
	С	most of the course learning	g outcomes. Show evidence of s	ecule organic chemistry knowledge, and sk some analytical and critical abilities and logi ely effective organizational and presentational	cal thinking, and ability to	
	D Demonstrate partial but limited command of biomolecule organic chemistry knowledge, and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	course learning outcomes.	Lack of analytical and critical a	ule organic chemistry knowledge, and skills bilities, logical and coherent thinking. Show entational skills are minimally effective or ine	very little or no ability to	
Course Type	Lecture-b	ased course				
Course Teaching	Activities	S	Details	No. of Hours		
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examinat	tion		60	CLO 1,2,3	
	Presenta	tion		10	CLO 1,2,3	
	Test		2-mid term tests	30	CLO 1,2,3	
Required/recommended reading and online materials	Bruice, P.	Y.; Organic Chemistry (	Pearson, 2017, 8th edition	n), Chapters 20-26.		

	Organic	chemistry labora	tory (6 credits)			Academic Year	2017
Offering Department	Chemistry					Quota	80
Course Co-ordinator	Dr A M Y	uen, Chemistry (ma	iyan@hku.hk)				
Teachers Involved	(Dr A M Y	Yuen, Chemistry)					
Course Objectives	and the control chemistry multistep	rovide students with intensive hands-on training of experimental chemistry techniques on organic reactions; the opportunity to develop analytical and critical thinking skills through scientific investigations in organic nistry experiments. The course focuses on the practical aspects of a variety of organic reactions, including and step syntheses. Chromatographic, instrumental, and spectroscopic techniques are also discussed to give a tic training of experimental organic chemistry.					
Course Contents & Topics	purificatio	e will include the , and characteriza stometry; infrared sp	tion of organic o	ómpounds; gas	and liquid cl	hromatography;	
Course Learning	On succe	sful completion of th	is course, students	should be able	to:		
Outcomes	us	monstrate a good page of chemicals		, ,		procedures for sa	afe handling and
		ry out, record and a					
	th	oly modern instrume results	•		e organic compo	ounds and draw	conclusions from
	CLO 4 communicate the results of their work to others						
		monstrate problem-s	<u> </u>		•	ing	
•			in CHEM3441, or a assed CHEM3441			HEM3441 in or b	pefore 2014-201
(and Co-requisites and Impermissible combinations)	NOT for s (for stude Pass in C any of the	udents who have parts admitted in 2014- HEM2441 or CHEM2 te two courses (for s	assed CHEM3441A 15 or before) 2442 or CHEM244 tudents admitted ir	A in semester 1 3; and Pass in 2015-16 or the	, 2015-16, or C CHEM3441 or ( reafter)	CHEM3442, or a	
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018	NOT for s (for stude Pass in C any of the	udents who have parts admitted in 2014- HEM2441 or CHEM2 te two courses (for seem 2nd sem Of	assed CHEM3441/ 15 or before) 2442 or CHEM244 tudents admitted in er in 2018 - 2019:	A in semester 1 3; and Pass in 2015-16 or the	, 2015-16, or C CHEM3441 or ( reafter)	CHEM3442, or a	lready enrolled in
Pre-requisites (and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018  Grade Descriptors (A+ to F)	NOT for s (for stude Pass in C any of the	udents who have parts admitted in 2014- HEM2441 or CHEM2 te two courses (for s	assed CHEM3441, 15 or before) 2442 or CHEM244 tudents admitted in fer in 2018 - 2019 : knowledge and thorou- es. Show strong analyt k, familiar and unfami	A in semester 1 3; and Pass in a 2015-16 or the EY gh command of cortical and critical abililiar situations. Cor	, 2015-16, or C CHEM3441 or	CHEM3442, or a  Examination es which are required nking, with ability to a experiment with effi	Dec May d for attaining all the apply knowledge to a cient lab skills and
(and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018 Grade Descriptors	NOT for s (for stude Pass in C any of the Y 1st	udents who have pats admitted in 2014- HEM2441 or CHEM2 te two courses (for some 2nd sem Of Demonstrate extensive course learning outcom wide range of completechniques. Critically arpresentational skills.  Demonstrate substantia learning outcomes. Shortitical abilities and logic skills and techniques and	assed CHEM3441, 15 or before) 2442 or CHEM244 tudents admitted in Fer in 2018 - 2019 : knowledge and thoroughs. Show strong analytic, familiar and unfami praise data to draw a command of a broad w substantial grasp an all thinking, and ability d critical analysis of exp	A in semester 1 3; and Pass in a 2015-16 or the EY gh command of contical and critical abililiar situations. Corppropriate and insignating of knowledge and mastery of the sto apply knowledge perimental data. Apple serimental data. Apple continuations in the storage of the sto	, 2015-16, or C CHEM3441 or (reafter)  Incepts and principle lities and logical thir mpetently conduct ghtful conclusions.  e and skills require subject knowledge. to familiar and som bly effective organiz.	Examination es which are require nking, with ability to a experiment with eff Apply highly effectiv d for attaining at leas Demonstrate evider ne unfamiliar situatior ational and presentat	Dec May d for attaining all the apply knowledge to a cient lab skills and e organizational and the transition of analytical and s. Show effective lal lonal skills.
(and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018 Grade Descriptors	NOT for s (for stude Pass in C any of the Y 1st	udents who have parts admitted in 2014- HEM2441 or CHEM2 te two courses (for sem 2nd sem Of Demonstrate extensive course learning outcom wide range of complet techniques. Critically appresentational skills. Demonstrate substantia learning outcomes. She critical abilities and logic	assed CHEM3441, 15 or before) 2442 or CHEM244 tudents admitted in er in 2018 - 2019 : knowledge and thorouges. Show strong analyt k, familiar and unfami praise data to draw a command of a broad w substantial grasp at all thinking, and ability d critical analysis of exp ut incomplete comman il but incomplete grasp king, and ability to appli	A in semester 1  3; and Pass in a 2015-16 or the cycle of the cycle and critical and critical abililiar situations. Corppropriate and insignange of knowledge are to apply knowledge perimental data. Appl of knowledge are of the subject knowly knowledge to mostly knowledge know	, 2015-16, or C CHEM3441 or 0 reafter)  Incepts and principle tities and logical thir inpetently conduct ghtful conclusions.  e and skills required subject knowledge.  to familiar and som only effective organiz d skills required f wledge. Demonstrat st familiar situations	Examination es which are require nking, with ability to a experiment with eff Apply highly effectiv d for attaining at leas Demonstrate evider ne unfamiliar situatior attonal and presentat or attaining most of te evidence of some s. Show moderately e	Dec May d for attaining all the apply knowledge to a cient lab skills and e organizational and st most of the course ice of analytical and s. Show effective lal ional skills. the course learning analytical and critica ffective lab skills and
(and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018 Grade Descriptors	NOT for s (for stude Pass in C any of the Y 1st A B C	udents who have pats admitted in 2014- HEM2441 or CHEM2 te two courses (for some 2nd sem Of Demonstrate extensive course learning outcom wide range of completechniques. Critically apresentational skills. Demonstrate substantia learning outcomes. Shot critical abilities and logic skills and techniques and Demonstrate general boutcomes. Show genera bilities and logical thin techniques. Demonstrate presentational skills. Demonstrate partial but some of factual informa apply them. Demonstrate Demonstrate Demonstrate Demonstrate Demonstrate Demonstrate partially efforts.	assed CHEM3441, 15 or before) 2442 or CHEM244 tudents admitted in er in 2018 - 2019: knowledge and thorouges. Show strong analytic, familiar and unfami praise data to draw a command of a broad w substantial grasp ar all thinking, and ability d critical analysis of exp ut incomplete comman il but incomplete grasp ting, and ability to appl ed some ability to appl ed some ability to ana limited command of knotion of the subject. Sh te evidence of some ective lab skills and tec	A in semester 1  3; and Pass in a 2015-16 or the Y gh command of cortical and critical abililiar situations. Corppropriate and insignation of the state of knowledge perimental data. Apparent of the subject knowly knowledge to mostlyze experimental of the subject knowly knowledge and skills roow a partial comprecoherent and logic chniques. Apply limit	, 2015-16, or C CHEM3441 or oreafter)  Incepts and principle ities and logical thin petently conduct ghtful conclusions.  Incepts and principle ities and logical thin petently conduct ghtful conclusions.  Incepts and some subject knowledge, to familiar and som ply effective organizard skills required wedge. Demonstratist familiar situations data critically. Applied applied for attaining hension of basic call thinking, but will and or barely effective call thinking, but will and or barely effective call thinking.	Examination es which are require nking, with ability to a experiment with eff Apply highly effectiv d for attaining at leas Demonstrate evider e unfamiliar situatior attional and presentat or attaining most of the evidence of some s. Show moderately e y moderately effectiv g course learning outconcepts and principle th limited analytical we organizational and	Dec May d for attaining all the apply knowledge to a cient lab skills and e organizational and st. Show effective lational skills. the course learning analytical and critical ffective lab skills and e organizational and critical ffective lab skills and e organizational and omes. Ability to recas and weak ability to rand critical abilities presentational skills.
(and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018  Grade Descriptors	NOT for s (for stude Pass in C any of the Y 1st A B	udents who have pats admitted in 2014- HEM2441 or CHEM2 te two courses (for sem 2nd sem Of Demonstrate extensive course learning outcome wide range of complete techniques. Critically appresentational skills. Demonstrate substantial learning outcomes. Shoritical abilities and logic skills and techniques an Demonstrate general boutcomes. Show general boutcomes. Show general billities and logical thin techniques. Demonstrate presentational skills. Demonstrate partial but some of factual informal apply them. Demonstrate partial but some of factual informal apply them. Demonstrate pennstrate presentational partial but some of factual informal apply them. Demonstrate pennstrate pennstrate partial but some of factual informal apply them. Demonstrate pennstrate pennst	assed CHEM3441, 15 or before) 2442 or CHEM244 tudents admitted in er in 2018 - 2019: knowledge and thorouges. Show strong analyt to familiar and unfami praise data to draw a command of a broad w substantial grasp ar all thinking, and ability d critical analysis of exp ut incomplete comman il but incomplete grasp ting, and ability to appl ed some ability to appl ed some ability to ana limited command of kno tion of the subject. Sh the evidence of some fective lab skills and the evidence of command of grasp of the knowledge show very little or no de show very little or no de	A in semester 1  3; and Pass in a 2015-16 or the Y gh command of colical and critical abililiar situations. Corppropriate and insignation of the state of the subject knowledge are of the subject knowledge and state of the subject knowledge and skills repow a partial comprecoherent and logic chiques. Apply limit of knowledge and stand understanding ability to apply knowledge and stand understanding ability to apply knowledge.	, 2015-16, or C CHEM3441 or oreafter)  ncepts and principle ities and logical thin petently conduct ghtful conclusions.  e and skills requires to familiar and som ply effective organizard skills required for attaining hension of basic or all thinking, but with the properties of the subject. Lackledge to solve professional skills required for attaining hension of basic or all thinking, but with the properties of the subject. Lackledge to solve professional skills required for attaining the subject. Lackledge to solve professional skills required for attaining the subject. Lackledge to solve professional skills required for attaining the subject. Lackledge to solve professional skills required for attaining the subject. Lackledge to solve professional skills required for attaining the subject. Lackledge to solve professional skills required for attaining the subject. Lackledge to solve professional skills required for attaining the subject of the subject. Lackledge to solve professional skills required for attaining the subject of the subject	Examination es which are requirenting, with ability to a experiment with eff Apply highly effective of concepts and presentation attaining at least Demonstrate evidence unfamiliar situation attaining most of the evidence of some some some of the evidence of	Dec May d for attaining all the apply knowledge to a cient lab skills and e organizational and ist most of the course is. Show effective lal ional skills. the course learning analytical and critical ffective lab skills and e organizational and orditical fective lab skills and e organizational and weak ability to recas and weak ability to recas and weak ability to recas and weak abilities presentational skills.

Course Teaching	Activities Details		No. of Hours	
& Learning Activities	Laboratory	12 x 4-hr lab sessions		48
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examination	(20% practical exam and 30% written exam)	50	CLO 1,2,3,4,5
	Laboratory reports	(Include Lab quiz, lab performance, pre-lab worksheet and lab report)	50	CLO 1,2,3,4,5
Required/recommended reading and online materials	John W. Lehman: Operational ( (Pearson, latest edition)	Organic Chemistry - A Problem-Sol	ving Approach to the I	Laboratory Course
Additional Course Information	Laboratory classes are mandatory course.	y. Students must complete ALL expe	eriments and laboratory	reports to pass this

CHEM3445	Integrated laboratory (6 credits)  Academic Y			Academic Yea	ar 2017		
Offering Department	Chemistry		i danto,	Quota	20		
Course Co-ordinator		Yuen, Chemistry <i>(mai</i>	ivan@hku hk)	quota	20		
Teachers Involved		Yuen, Chemistry)	yan@ma.my				
Course Objectives	This course aims to provide students with experience using techniques employed in synthetic organic and organometallic chemistry. This advanced synthesis course covering a variety of synthetic methods, including vacuum and inert atmosphere techniques to prepare organic and organometallic compounds; methods for separation of mixtures and isolation of products by use of column and thin-layer chromatography, sublimation an extraction techniques. Experiments on characterization and identification by chemical and spectroscopic method form an important part of the course. The use of the chemical literature in molecular design and synthesis planning is also included.						
Course Contents & Topics	synthesis	planning, experiment	owing laboratory skills and practices: latal set up, purification, and characterize				
Course Learning Outcomes	On succest CLO 1 De us CLO 2 De CLO 3 Aş	Instrumentation techniques.  On successful completion of this course, students should be able to:  CLO 1 Demonstrate a good practice of laboratory safety and exercise proper procedures for safe handling an usage of chemicals  CLO 2 Demonstrate proficiency in synthetic chemical laboratory techniques  CLO 3 Apply modern instrumentation techniques to characterize organic compounds and draw conclusions from the results  CLO 4 Analyze the influence of chemical structure on the physical and chemical properties of organic molecules					
	CLO 5 De	emonstrate problem-s	olving skills, critical thinking and analytic	al reasoning			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	HEM3443 or already	enrolled in this course				
Offer in 2017 - 2018	Y Sur	mmer Offer in 2018	- 2019 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A Demonstrate extensive knowledge and thorough command of concepts and principles which are required for attaining outcomes. Show strong analytical and critical abilities and logical thinking, with ability to apply knowledge techniques. Critically appraise data to draw appropriate and insightful conclusions. Apply highly effective organizat presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the learning outcomes. Show substantial grasp and mastery of the subject knowledge. Demonstrate evidence of analy critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Show eff skills and techniques and critical analysis of experimental data. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course outcomes. Show general but incomplete grasp of the subject knowledge. Demonstrate evidence of some analytical a abilities and logical thinking, and ability to apply knowledge to most familiar situations. Show moderately effective lab techniques. Demonstrated some ability to analyze experimental data critically. Apply moderately effective lab techniques. Demonstrate partial but limited command of knowledge and skills required for attaining course learning outcomes. Abilit some of factual information of the subject. Show a partial comprehension of basic concepts and principles and weak apply them. Demonstrate evidence of some coherent and logical thinking, but with limited analytical and critical Demonstrate partially effective lab skills and techniques. Apply limited or barely effective organizational and presentation evidence of little or no evidence of command of knowledge and skills required for attaining the course learning outcome evidence of little or no prasp of the knowledge and understanding of the subject. Lack of analytical and critical abilitie and coherent thin						
Course Type		ith laboratory compon					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Laborator	у			48		
	Tutorials	/ Calf study			12		
Assessment Methods		/ Self study	Deteile	Walashin ! fi !	100		
and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Laborator	ry reports	(Practical Examination 25%; Lab report 10%; Lab performance 10%)	45	CLO 1,2,3,4,5		
	Presentat	tion		20	CLO 3,4,5		
	Test		Test/ Quiz	35	CLO 1,2,3,4,5		
Required/recommended reading and online materials		Lehman: Operationa latest edition)	l Organic Chemistry - A Problem-Sol	ving Approach to the	Laboratory Course		

Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.

CHEM3541	Physical chemistry: Introduction to quantum chemistry (6 credits)  Academic Y				2017
Offering Department	Chemistry	Quota	100		
Course Co-ordinator	Prof G H	Chen, Chemistry (ghc@	)yangtze.hku.hk)		
Teachers Involved	(Prof A S	C Cheung, Chemistry)			
Course Objectives	The course presents fundamental principles and topics on quantum chemistry in order to provide a soiled foundation for students intending to further their studies in chemistry.				
Course Contents & Topics	Elementary quantum mechanics: Historical development, Postulates of quantum mechanics, Principles of quantum mechanics, Theory of angular momentum, Heisenberg uncertainty principle. Applications to simple systems particle in a box, harmonic oscillator, rigid rotator; Atomic structure: Hydrogen and many electron atoms. Molecula structure and chemical bonds. Approximation methods: variational method, Hartree-Fock method, valence bond theory, and perturbation theory.				
Course Learning	On succe	ssful completion of this	course, students should be able to:		
Outcomes	CLO 1 ur	nderstand and use the ourse	terminology and nomenclature in qua		
		emonstrate knowledge olecular structure	and understanding of basic conce	epts in quantum mecha	nics, atomic and
	m	olecular systems	numerical procedures and the basic		m mechanics and
		· · · · · · · · · · · · · · · · · · ·	he application of Hartree-Fock method	to molecules	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	HEM2541			
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2	2019 · Y	Examination	Dec
Grade Descriptors	A		stery at an advanced level of extensive know		
(A+ to F)	learning outcomes. Show strong analytical and critical abilities and logical thinking, with thorough grasp of the subject, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.				
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and substantial grasp of the subject, ability to apply knowledge to familiar and some unfamiliar situations. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and general but incomplete grasp of the subject, ability to apply knowledge to most familiar situations. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show partial but limited grasp of the subject, retention of some relevant information of the subject, ability to apply knowledge to solve problems. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.				
	Fail	Demonstrate little or no ev	idonoo of command of knowledge and akilla re-	quired for attaining the course le	clusions.
		subject, very little or no a	tilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate	or no grasp of the knowledge at Apply minimally effective or in	clusions. earning outcomes. Lack and understanding of the
	Lecture w	subject, very little or no a	ilities, logical and coherent thinking. Show little ibility to apply knowledge to solve problems. and results and/or unable to draw appropriate	or no grasp of the knowledge at Apply minimally effective or in	clusions. earning outcomes. Lack and understanding of the
Course Teaching	Lecture w	subject, very little or no a techniques. Misuse of data rith laboratory compone	ilities, logical and coherent thinking. Show little ibility to apply knowledge to solve problems. and results and/or unable to draw appropriate	or no grasp of the knowledge at Apply minimally effective or in	clusions. earning outcomes. Lack and understanding of the
Course Teaching	Activities Lectures	subject, very little or no a techniques. Misuse of data rith laboratory compone s	ilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate nt course	or no grasp of the knowledge at Apply minimally effective or in	clusions.  parning outcomes. Lacing dunderstanding of the effective lab skills and the state of the control of the state o
Course Teaching	Activities Lectures Laborator	subject, very little or no a techniques. Misuse of data rith laboratory compone s	ilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate nt course	or no grasp of the knowledge at Apply minimally effective or in	clusions.  parming outcomes. Lac and understanding of the effective lab skills and  No. of Hours  24  24
Course Teaching	Activities Lectures Laborator Tutorials	subject, very little or no a techniques. Misuse of data rith laboratory compone s	ilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate nt course	or no grasp of the knowledge at Apply minimally effective or in	clusions.  parming outcomes. Lac and understanding of the effective lab skills and  No. of Hours  24  24  6
Course Teaching	Activities Lectures Laborator Tutorials	subject, very little or no a techniques. Misuse of data rith laboratory compone s	ilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate nt course	or no grasp of the knowledge at Apply minimally effective or in	clusions.  parming outcomes. Lac and understanding of th effective lab skills and  No. of Hours  24  24
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Laborator Tutorials	subject, very little or no a techniques. Misuse of data rith laboratory compone s	ilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate nt course	or no grasp of the knowledge at Apply minimally effective or in	No. of Hours  24  6  100  Assessment  Methods
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Laborator Tutorials Reading	subject, very little or no a techniques. Misuse of data virth laboratory compone s	ilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate nt course  Details	or no grasp of the knowledge at Apply minimally effective or in conclusions.  Weighting in final	No. of Hours  24  24  6  100  Assessment Methods to CLO Mapping CLO 1,2,3
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Laborator Tutorials Reading	subject, very little or no a techniques. Misuse of data rith laboratory compone s  ry / Self study ition	ilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate nt course  Details	or no grasp of the knowledge at Apply minimally effective or inconclusions.  Weighting in final course grade (%)	No. of Hours  24  6  100  Assessment  Methods  to CLO Mapping
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Activities Lectures Laborator Tutorials Reading Methods  Examinat Laborator Test	subject, very little or no a techniques. Misuse of data rith laboratory compone s  ry / Self study tion ry reports	ilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate nt course  Details  Details  Experiment & Lab report Test/Quiz	or no grasp of the knowledge at Apply minimally effective or inconclusions.  Weighting in final course grade (%)	No. of Hours  24  24  6  100  Assessment Methods to CLO Mapping CLO 1,2,3
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Laborator Tutorials Reading Methods  Examinat Laborator Test D. A. McG	subject, very little or no a techniques. Misuse of data rith laboratory compone s  ry / Self study tion ry reports	ilities, logical and coherent thinking. Show little bility to apply knowledge to solve problems. and results and/or unable to draw appropriate nt course  Details  Details  Experiment & Lab report Test/Quiz nistry (2nd Edition, 2007)	or no grasp of the knowledge at Apply minimally effective or inconclusions.  Weighting in final course grade (%)  70 20	No. of Hours  24  6  100  Assessment  Methods  to CLO Mapping  CLO 1,2,3,4

CHEM3542	Physical chemistry: statistical thermodynamics and kinetics theory (6 credits)	Academic Year	2017
Offering Department	Chemistry	Quota	50
Course Co-ordinator	Dr. J Yang, Chemistry (juny@hku.hk)		
Teachers Involved	(Dr J Yang, Chemistry)		
Course Objectives	The course presents fundamental principles and topics on statistical thermod provide a solid foundation for students intending to further their studies in physical provides a solid foundation for students intending to further their studies in physical provides a solid foundation for students intending to further their studies in physical provides a solid foundation for students and topics on statistical thermod		
Course Contents & Topics	Principles of Statistical Thermodynamics  - Thermodynamic laws  - Ensembles and partition functions: microcanonical, canonical and grand-can  - Systems of independent molecules: ideal gas  - Molecular degrees of freedom: translation, rotation, vibration, and electronic  - Ideal gas mixture: chemical equilibrium, binding, and titration  - Quantum statistics  Chemical equilibrium and kinetics theory		

Course Learning	On succes	ssful completion of	this course, students should be able to:			
Outcomes	CLO 1 ur		the terminology and nomenclature in stati	stical thermodynamics a	nd topics discussed	
	CLO 2 de	emonstrate knowled	lge and understanding of basic concepts i	n statistical thermodynar	nics	
			n between macroscopic observables and	•		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	Pass in CHEM2541				
Offer in 2017 - 2018	Y 2nd	I sem Offer in 201	8 - 2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	Α		t an advanced level of extensive knowledge of e of strong analytical / critical abilities and logical th			
	В		of knowledge of statistical thermodynamics and re ogical thinking. Understand the scope of Physica			
	С		te command of knowledge of statistical thermodyna	mics and reaction dynamics. [	Demonstrate evidence of	
	D		n apply the knowledge to familiar situations.	hermodynamics and reaction	dynamics Demonstrate	
	Partial but limited command of knowledge of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate limited evidence of analytical thinking. Understand the question to be solved with knowledge.					
	Fail	Little or no evidence of	f command of knowledge of statistical thermodynam	nics and reaction dynamics.		
Course Type	Lecture w	ith laboratory comp	onent course			
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures			24		
	Laborator	У			24	
	Tutorials				4	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	continuous assessment of on class quizzes & assignments	40	CLO 1,2,3	
	Examination			60	CLO 1,2,3	
Required/recommended reading and conline materials	P. Atkins,	Physical Chemistry	(10th edition)			
Course Website	Nil					
Additional Course Information	course. Students before tak	are strongly recom ing this course.	datory. Students must complete ALL exp mended to take CHEM3541 Physical Ch ular driving forces: statistical thermodyr	emistry: Introduction to	Quantum Chemistry	

CHEM3999	Directe	d studies in chemistry (6 credits)		Academic Year	2017		
Offering Department	Chemistr	у ,		Quota			
Course Co-ordinator	Prof D L Phillips, Chemistry (phillips@hku.hk)						
Teachers Involved	(Various	teachers in the Department, Chemistry)					
Course Objectives		se is designed for third year students who wan opportunity to carry out small scale chemic			esearch. It offer		
Course Contents & Topics	contents	interested in taking this course should cont and the nature of their project in the coming or and the course coordinator is required.					
Course Learning	On succe	essful completion of this course, students shou	ıld be able to:				
Outcomes	W	nderstand the terminology and nomenclatur orked on in the course			. , ,		
		emonstrate knowledge and understanding of t	•	·	•		
		nderstand the relationships of the their particu	. ,		,		
Pre-requisites (and Co-requisites and Impermissible combinations)	CHEM4X or CHEM This caps This cour	at least 24 credits of advanced level disc XX) in the Chemistry Major including a pass 3146. stone course is for Chemistry Major students of se is designed for third year students who wo est that a student is allowed to take this capsto	in CHÉM2341 or CHEM2 only. uld like to take an early ex	2441 or CHEM244  sperience on rese	2 or CHEM254		
Offer in 2017 - 2018		t sem 2nd sem Offer in 2018 - 2019 : Y	one course to their your c	Examination	No Exam		
Grade Descriptors (A+ to F)	A	Show an extensive comprehension of the subject. De originality. Illuminating utilization and critical analysis sources. Critical employment of data and results to sy of a wide range of appropriate theories, principles, d	s / evaluation of information ac nthesize appropriate and illumin ata and methods. Employ very litional work beyond that is requi	and critical thought wi equired from a wide r lating conclusions. De effective organizational red in wider areas rela	th presence of some ange of high quality monstrate integrational and presentational evant to the topic.]		
	B Show a substantial comprehension of the subject. Demonstrate able analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose meaningful comparisons between different secondary interpretations Correct utilization of data and results to form appropriate conclusions. Compose general integration of theories, principles, data and methods. Perform effective organizational and presentational skills.						
	C Show a general but incomplete comprehension of the subject. Presence of some analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose comparisons between different interpretations. Mainly correct but some incorrect utilization of data and results to form appropriate conclusions. Demonstrate some partial integration of theories, principles, data and methods. Perform moderately effective organizational and presentational skills.						
	D Show a partial but limited comprehension, with knowledge of some relevant information, of the subject. Presence of some coherent and logical thinking, but with limited analytical and critical abilities. Show utilization and reference of several sources, but mostly via summary instead of by analysis and comparison. Limited ability to employ data and results to form appropriate conclusions. Demonstrate limited integration of theories, principles, data and methods. Perform limited or marginally effective						
	D	coherent and logical thinking, but with limited analytic but mostly via summary instead of by analysis and c	cal and critical abilities. Show ut comparison. Limited ability to en	tilization and reference	e of several sources to form appropriat		

	thinking. Limited employment of secondary sources and no critical comparison of them. Incorrectly utilize data and results and/or unable to form appropriate conclusions. Demonstrate little or no integration of theories, principles, data and methods. Organization and presentational skills are of very limited use or ineffective.				
Course Type	Project-based course				
Course Teaching	Activities	Details		No. of Hours	
& Learning Activities	Reading / Self study	discussion & meetings to be arran the supervisor	discussion & meetings to be arranged by the student and the supervisor		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Dissertation	including a written report and an oral presentation	100	CLO 1,2,3	
Required/recommended reading and online materials	Recommended reading material	terial will be assigned depending on the pro	pject.		
Additional Course Information		gth of the students is required for taking th poratory component as Course Teaching &			

CHEM4142	Symmet	try, group theory and applications (6 credits)	Academic Yea	ır 2017			
Offering Department	Chemistry	1	Quota	60			
Course Co-ordinator	Prof V W W Yam, Chemistry (wwyam@hku.hk)						
Teachers Involved	(Prof C M Che,Chemistry) (Prof V W W Yam,Chemistry)						
Course Objectives	course a spectrosc	To introduce the concepts of symmetry and group theory and to apply them in solving chemical problems. This course also provides an introductory treatment of bonding theories, inorganic electronic and vibrational spectroscopy. This course is essential for students who wish to take advanced courses in inorganic chemistry and all types of spectroscopy.					
Course Contents & Topics	Symmetry character molecular	Symmetry elements and symmetry operations; symmetry point groups; reducible and irreducible representations; character tables; direct products; symmetry-adapted linear combinations; projection operators; hybrid orbitals; molecular orbital theory for organic, inorganic and organometallic systems; selected applications in electronic and vibrational spectroscopy.					
Course Learning	On succe	ssful completion of this course, students should be able to:					
Outcomes	ch	nderstand the basic principles and concepts of symmetry and g nemical problems emonstrate knowledge and understanding in the use of ch		. ,			
	CLO 3 de	chniques emonstrate knowledge and understanding of bonding theories thitals for organic increanic and organization existence	involving hybrid orbit	als and molecular			
	CLO 4 de	bitals for organic, inorganic and organometallic systems emonstrate knowledge and understanding in the application of nd vibrational spectroscopy	symmetry and group t	heory in electronic			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C						
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2019 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	В	Demonstrate thorough knowledge and understanding of essential facts, con and group theory and their applications in solving chemical problems, es symmetry operations; symmetry point groups; reducible and irreducible r symmetry-adapted linear combinations; projection operators; treatment of molecular orbitals for organic, inorganic and orgametallic systems; and app Show strong ability to apply and integrate knowledge and theory relating to group theory and their applications in bonding, and electronic and vibrational problems and critical use of data and experimental results to draw appropriat and applications of symmetry and group theory.  Demonstrate substantial command of knowledge and understanding of esser	pecially those related to sy epresentations; character it if bonding theories includir lications in electronic and vi the basic principles and cor spectroscopy. Show strong e and insightful conclusions	Immetry elements and ables; direct products; gi hybrid orbitals and brational spectroscopy. In the principles of symmetry and ability to analyze novel relating to the principles			
		to symmetry and group theory and their applications in solving chemica elements and symmetry operations; symmetry point groups; reducible and products; symmetry-adapted linear combinations; projection operators; trea and molecular orbitals for organic, inorganic and orgametallic systems spectroscopy. Show evidence to apply and integrate knowledge and theory symmetry and group theory and their applications in bonding, and electron analyze novel problems and correct use of data and experimental result principles and applications of symmetry and group theory.	I problems, especially thos irreducible representations; tment of bonding theories i ; and applications in elec ry relating to the basic prin ic and vibrational spectrosc	e related to symmetry character tables; direct ncluding hybrid orbitals tronic and vibrational ciples and concepts of opy. Show evidence to			
	С	Demonstrate general but incomplete command of knowledge and understatheories relating to symmetry and group theory and their applications in solf symmetry elements and symmetry operations; symmetry point groups; retables; direct products; symmetry-adapted linear combinations; projection hybrid orbitals and molecular orbitals for organic, inorganic and orgame vibrational spectroscopy. Show evidence of some abilities to apply and interprinciples and concepts of symmetry and group theory and their applic spectroscopy. Show ability to analyze problems to most familiar situations experimental results to draw appropriate conclusions relating to the principles	ving chemical problems, est ducible and irreducible repoperators; treatment of bon tallic systems; and applicate egrate knowledge and theo ations in bonding, and ele and mostly correct but error and the control of th	pecially those related to resentations; character ding theories including ions in electronic and ry relating to the basic ctronic and vibrational neous use of data and			
	D	Demonstrate partial but limited command of knowledge and understanding or relating to symmetry and group theory and their applications in solving chemelements and symmetry operations; symmetry point groups; reducible and products; symmetry-adapted linear combinations; projection operators; treat and molecular orbitals for organic, inorganic and orgametallic systems spectroscopy. Show evidence of limited abilities to apply and integrate know concepts of symmetry and group theory and their applications in bonding, limited ability to analyze problems to most familiar situations and mostly or results to draw appropriate conclusions relating to the principles and applications.	of essential facts, concepts, iical problems, especially the irreducible representations; trent of bonding theories i ; and applications in elec- ledge and theory relating to and electronic and vibration orrect but erroneous use of	principles, and theories use related to symmetry character tables; direct ncluding hybrid orbitals stronic and vibrational the basic principles and all spectroscopy. Show data and experimental			
	Fail	Demonstrate little or no evidence of command of knowledge and understa theories relating to symmetry and group theory and their applications in sol' symmetry elements and symmetry operations; symmetry point groups; re tables; direct products; symmetry-adapted linear combinations; projection hybrid orbitals and molecular orbitals for organic, inorganic and orgame vibrational spectroscopy. Show little or no evidence of abilities to apply and iprinciples and concepts of symmetry and group theory and their applic spectroscopy. Show little or no ability to analyze problems to most far experimental results to draw appropriate conclusions relating to the principles	ving chemical problems, est ducible and irreducible re- poperators; treatment of bon tallic systems; and applical integrate knowledge and the ations in bonding, and ele niliar situations and errone	pecially those related to resentations; character ding theories including ions in electronic and ory relating to the basic ctronic and vibrational cous use of data and			

Course Type	Lecture-based course			
Course Teaching	Activities	ies Details		No. of Hours
& Learning Activities	Lectures			36
	Tutorials	or discussion		12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	(continuous assessment)	25	CLO 1,2,3,4
	Examination		75	CLO 1,2,3,4
Required/recommended reading and online materials	F.A. Cotton: Chemical Applic	cations of Group Theory (Wiley, 3rd ec	J., 1990)	

CHEM4143	Interfac	ial science and tech	nology (6 credits)	Academic Ye	ar 2017		
Offering Department	Chemistr			Quota	50		
Course Co-ordinator	Prof G K	Y Chan, Chemistry (hrsd	cky@hku.hk)				
Teachers Involved							
Course Objectives	To understand the science and technology of interfacial phenomena and processes often appeared in high value added products and modern technologies.						
Course Contents & Topics	,	Physics and Chemistry of Interfaces: coatings and surfactants, colloids and interfaces, wetting, microemulsion, thir films, nanomaterials, porous materials.					
Course Learning	On succe	essful completion of this of	course, students should be able t	0:			
Outcomes	CLO 1 u	nderstand interfacial phe	nomena and their origin from mo	lecular details			
		olve problems in interfa nermodynamics, and kind	acial science and technology letics	by applying knowledge of	general chemistry,		
			nologies that require application acy, composite polymers, and polymers	•	ding nanomaterials,		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	HEM3541					
Offer in 2017 - 2018	N Off	fer in 2018 - 2019 : Y		Examination			
Grade Descriptors (A+ to F)	A						
	B Demonstrate substantial knowledge of interfacial science and technology and command of skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to solve problems in familiar and some unfamiliar situations. Correct use of data and sourcing of references. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete knowledge of interfacial science and technology and command of skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge solve problems to most familiar situations. Mostly correct but some erroneous use of data and references. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited knowledge of interfacial science and technology and command of skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited ability to use data and source references. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of knowledge of interfacial science and technology, and command of skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Misuse of data and references. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures			36			
	Tutorials		or discussion	12			
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents	(continuous assessment)	5	CLO 1,2,3		
	Examination			70	CLO 1,2,3		
	Test		test/quiz	25	CLO 1,2,3		
Required/recommended reading and online materials	Barnes a	nd Gentle: Interfacial Sci	ence	'			
Additional Course Information	NIL This cour	se is offered every other	year.				

CHEM4144	Advanced materials (6 credits)	Academic Year	2017				
Offering Department	Chemistry	Chemistry Quota 50					
Course Co-ordinator	Prof W K Chan, Chemistry (waichan@hku.hk)						
Teachers Involved	(Dr J Y Tang,Chemistry) (Dr Y F Wang,Chemistry) (Prof W K Chan,Chemistry)						
Course Objectives	This course is a continuation from Introdution to Materials Chemistry. It provides on materials chemistry and application of materials in advanced technology materials chemistry will also be discussed.						
Course Contents & Topics	Advanced polymerization methods: copolymerization and applications of copol control of stereochemistry in polymers; ionic and radical living polymerization. high strength materials; high temperature polymers, polyelectrolytes, condu-	Materials for spec	ialty ápplications				

Course Learning	On succe	essful completion of t	his course, students should be able t	0:	
Outcomes	CLO 1 c	describe the mechar polymerizations	nisms and kinetics of copolymeriza	tions, coordination polymer	, ,
			some engineering polymers for high t fected by the molecular structures	emperature/high strength ap	oplications, and how
	CLO 3	demonstrate knowled	ge in advanced materials characteriz	ation techniques	
	CLO 4 L	understand the workir	ng principles of materials for informati	on storage and opto-electron	nic applications
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (	CHEM3143			
Offer in 2017 - 2018	Y 2r	nd sem Offer in 201	8 - 2019 : Y	Examination	May
Grade Descriptors (A+ to F)	A	approach in polymer's ability to apply and interability to analyze nove	knowledge and understanding of essential ynthesis, properties, application, and characte grate knowledge and theory relating to the sy I problems and critical use of data and experinate laterials synthesis and their properties.	erization of materials for advanced nthesis and applications of advance	technology. Show strong at materials. Show strong
	В	to frontier approach in Show evidence to app Show evidence to and	al command of knowledge and understanding n polymer synthesis, properties, application, oly and integrate knowledge and theory relatinal slyze novel problems and correct use of data laterials synthesis and their properties.	and characterization of materials fing to the synthesis and application	or advanced technology s of advanced materials
	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show evidence of some abilities to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to advanced materials synthesis and their properties.				
	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to advanced materials synthesis and their properties.				
	Fail	theories relating to from technology. Show little applications of advance	no evidence of command of knowledge and titer approach in polymer synthesis, properties e or no evidence of abilities to apply and intreded materials. Show little or no ability to analys results to draw appropriate conclusions relating	s, application, and characterization egrate knowledge and theory relat re problems to most familiar situation	of materials for advanced ing to the synthesis and ons and erroneous use o
Course Type	Lecture-l	based course			
Course Teaching	Activitie	es	Details		No. of Hours
& Learning Activities	Lectures	3			36
	Tutorials		or discussion		12
	Reading	g / Self study			100
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	nents	(continuous assessment)	20	CLO 1,2,3,4
	Examina	ation		80	CLO 1,2,3,4
Required/recommended reading and	Examination 80 CLO 1,2,3,4 G. Odian: Principles of Polymerizations (John Wiley and Sons, 2004) Other specialist references will be given throughout the course.				

CHEM4145	Medicin	al chemistry (6 credits)	Academic Year	2017		
Offering Department	Chemistr	y	Quota	70		
Course Co-ordinator	Prof H Z	Sun, Chemistry (hsun@hku.hk)				
Teachers Involved	`	i,Chemistry) Sun,Chemistry)				
Course Objectives	in areas	This course covers the chemical principles of drug design and drug action and uses as an introduction to research in areas of bioorganic chemistry, bioinorganic chemistry, medicinal chemistry, pharmaceutical chemistry, and biotechnology.				
Course Contents & Topics	computer - Drug-re - Proteins - Metals i - DNA-Dr	scovery, design, and development: lead discovery, pharmacophor- aided drug design, combinatorial chemistry and high-throughput ceptor interactions ( (and enzymes) and nucleic acids as drug targets n medicine ug interactions etabolism and prodrugs and drug delivery		ationships (SAR),		
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 demonstrate knowledge of drug discovery, design and development					
	CLO 2	understand drug-biomolecule interactions where appropriate				
	CLO 3	gain appropriate knowledge of drug metabolism and drug delive	erv			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	Pass in CHEM3441 or CHEM3442				
Offer in 2017 - 2018	Y 2n	d sem Offer in 2018 - 2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough knowledge and understanding of essential facts, concertion foundation knowledge of medicinal chemistry, especially those related to drug drug lead optimization; structure activity relationship; pharmacokinetics; drug of ability to apply and integrate knowledge and theory relating to the basic four strong ability to analyze novel problems and critical use of data and expering conclusions relating to the basic principles and knowledge of medicinal chemis for medicinal chemistry, especially in drug discovery and metabolism.	discovery, design and develor delivery and its relevance to indation knowledge of medici mental results to draw appro	opment; drug targets; toxicity. Show strong nal chemistry. Show opriate and insightful		
	В	Demonstrate substantial command of knowledge and understanding of essenti	al facts, concepts, principles,	and theories relating		

Additional Course		urse is also offered to RPg students, and the course code for RPg students is CHEM6113.				
Required/recommended reading and online materials	Medicinal Chemistry D. Wang, S.J. Lippar	Introduction to Medicinal Chemistry (3/e), G.L. Patrick, Oxford University Press, 2005 edicinal Chemistry- An Introduction, G. Thomas, John Wiley, 2000 Wang, S.J. Lippard (2004) Nat. Rev. Drug Dis., Cellular processing of platinum anticancer drugs, 4, 307-320				
	Examination		75	CLO 1,2,3		
	Assignments	(continuous assessment)	25	CLO 1,2,3		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Reading / Self study			100		
	Tutorials	or discussion	or discussion			
& Learning Activities	Lectures					
Course Teaching	Activities	Details		No. of Hours 36		
Course Type	Lecture-based cours					
	Show evide Show evide Show evide relating to chemistry.  C Demonstra theories rel developme relevance foundation erroneous medicinal condition of the control of the contro	theories relating to the basic foundation knowledge of medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show evidence of some abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal chemistry. Show ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of medicinal chemistry. Demonstrate moderately effective basic techniques, basic techniques for medicinal chemistry, especially in drug discovery and metabolism.  Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal chemistry. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of medicinal chemistry. Demonstrate partially effective basic techniques for medicinal chemistry, especially in drug discovery and metabolism.				

CHEM4147	Supramo	lecular chemistry (6 credits)	Academic Year	2017		
Offering Department	Chemistry	<u> </u>	Quota	40		
Course Co-ordinator	Dr H Y Au-	reung, Chemistry (hoyuay@hku.hk)				
Teachers Involved		Yeung,Chemistry) ng,Chemistry)				
Course Objectives	students to	cular chemistry concerns the chemistry beyond that of molecules concepts and techniques in supramolecular chemistry, demonstraular structures leads to functions and properties, and their relevance	iting how molecul	ar assembly and		
Course Contents & Topics	building blo as macrocy	Basic concepts in molecular recognition and self-assembly; non-covalent interactions and common supramolecular building blocks; methods in supramolecular chemistry. Selected topics in modern supramolecular chemistry, such as macrocycles and cages, molecular capsule and container molecules, synthetic receptors, interlocked structures, supramolecular polymers and supramolecular chemistry of biomolecules and biomaterials, will also be discussed.				
Course Learning	On success	ful completion of this course, students should be able to:				
Outcomes	CLO 1 Uno	lerstand important principles and concepts in supramolecular chemis	stry			
	CLO 2 Demonstrate knowledge and understanding in the nature of non-covalent interactions and to apply these concepts in the design and explanation of the structures, properties and functions of different supramolecular systems					
		rpret and analyse physical characterization data of supramolecu mical information to explain the properties of the supramolecular sys		extract relevant		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHI	EM3341 and CHEM3441				
Offer in 2017 - 2018	Y 2nd s	sem Offer in 2018 - 2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate thorough knowledge and understanding of essential facts, concepts a especially those relating to non-covalent interactions, molecular recognition and self- integrate knowledge in supramolecular chemistry in explaining the formation and supramolecular systems. Show strong ability to analyse and interpret experimental d to the advanced principles and properties of supramolecular systems.	and principles in supra- assembly. Show stron properties of, and in	molecular chemistry, ig ability to apply and in designing different		
	В	Demonstrate substantial knowledge and understanding of essential facts, concepts especially those relating to non-covalent interactions, molecular recognition and su integrate knowledge in supramolecular chemistry in explaining the formation and supramolecular systems. Show evidence to analyse and interpret experimental data the advanced principles and properties of supramolecular systems.	elf-assembly. Show ever properties of, and in	vidence to apply and n designing different		
	:	Demonstrate partial but incomplete command of knowledge and understanding of supramolecular chemistry, especially those relating to non-covalent interactions, mol evidence of limited ability to apply and integrate knowledge in supramolecular or properties of, and in designing different supramolecular systems. Show limited ability to draw appropriate conclusions relating to the advanced principles and properties of	ecular recognition and chemistry in explaining to analyse and interp	self-assembly. Show g the formation and ret experimental data		

	supramolecular che little or no ability to in designing differ	emistry, especially those relating to non-covale apply and integrate knowledge in supramolec ent supramolecular systems. Show little or r	evidence of command of knowledge and understanding of essential facts, concepts and principles in			
Course Type	Lecture-based course					
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading / Self study		100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination		65	CLO 1,2,3		
	Presentation		15	CLO 1,2,3		
	Test	Tests/Assignments	20	CLO 1,2,3		
Required/recommended reading and online materials	Supramolecular Chemistry by Jonathan W. Steed and Jerry L. Atwood, John Wiley & Sons, Ltd., 2nd Edition, 2009 Modern Physical Organic Chemistry by Eric V. Anslyn and Dennis A. Dougherty, University Science Books, 2006					
Additional Course Information	References to specialist texts and other published materials will be made throughout the course.					

CHEM4241	Modern	chemical instrur	nentation and applications (6 cre	dits) Academic Y	ear 2017	
Offering Department	Chemistr			Quota	50	
Course Co-ordinator	Dr I K Ch	iu, Chemistry (ivanko	hu@hku.hk)			
Teachers Involved	,	hu,Chemistry) Chan,Chemistry)				
Course Objectives	principles	and practical aspec	provide an understanding of modern into of instrument design. The course will areer in technical sales/service.		•	
Course Contents & Topics	Metabolo Laser Sp frequency noise enh Atomic F spectrom detectors Atomic X	Biological Mass spectrometry: Liquid Chromatography-Tandem Mass Spectrometry for Proteomics & Metabolomics.  Laser Spectroscopy: Principle of laser; three-level and four-level lasers; laser instrumentation (Q-switching and frequency conversion); laser-induced fluorescence; laser atomic spectrometry; laser remote sensing; signal-to noise enhancement by boxcar integration and photon counting.  Atomic Plasma Spectrometry: Inductively couple plasma-atomic emission spectrometry (ICP-AES) and mass spectrometry (ICP-MS); signal-production processes in ICP spectrometry; Echelle grating spectrometer; array detectors; interferences in ICP-AES and ICP-MS.  Atomic X-ray Spectrometry: x-ray fluorescence; wavelength-dispersive (WDXRF) and energy-dispersive (EDXRF) X-ray fluorescence spectrometers				
Course Learning Outcomes	CLO 1 e id	xplain the principle dentification and quar	are identified and sequenced exper	·		
	<ul> <li>CLO 3 use the database searching techniques and software tools to analyze high-throughput proteomics</li> <li>CLO 4 apply LC/MS/MS method for target quantitative analysis of small molecules</li> <li>CLO 5 explain the principles of the laser spectroscopy, atomic plasma spectrometry, and atom spectrometry</li> <li>CLO 6 describe the basic experimental set up and the properties of the basic components of the instrume in the laboratory classes</li> </ul>					
Pre-requisites and Co-requisites and Impermissible combinations)		CHEM3241				
Offer in 2017 - 2018	Y 1st	t sem Offer in 2018	- 2019 : Y	Examination	n Dec	
Grade Descriptors (A+ to F)	В	chemical instrumentation to analyze problems reinchemical permonstrate substantiato the modern chemical ability to analyze problem permonstrate general the theories relating to the integrate knowledge and the substantial problems.	knowledge and understanding of essential facts, cons and applications. Show strong ability to apply lated to fundamental principles and practical aspecal command of knowledge and understanding of eal instrumentations and applications. Show evider ems related to fundamental principles and practical put incomplete command of knowledge and under modern chemical instrumentations and applicand theory, and to analyze problems to most fame	and integrate knowledge and ts of instrument design. ssential facts, concepts, prin- nce to apply and integrate k aspects of instrument design erstanding of essential facts titions. Show evidence of so	d theory, and strong abilitiviples and theories relation nowledge and theory, and theory, and the concepts, principles and the abilities to apply and the concepts, principles and the abilities to apply and the concepts.	
	D	Demonstrate partial bu relating to the modern knowledge and theory, practical aspects of inst	aspects of instrument design.  Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles and theories elating to the modern chemical instrumentations and applications. Show evidence of limited abilities to apply and integrate knowledge and theory, and limited ability to analyze problems to most familiar situations related to fundamental principles and practical aspects of instrument design.			
	Fail Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show little or no evidence of abilities to apply and integrate knowledge and theory, and little or no ability to analyze problems to most familiar situations related to fundamental principles and practical aspects of instrument design.					
Course Type	Lecture w	vith laboratory compo	nent course			
Course Teaching	Activitie	s	Details		No. of Hours	
Learning Activities	Lectures					
- Louining Activities	Laborato	ory				
					12	
	Tutorials				· -	
		/ Self study			100	

	Examination		65	CLO 1,2,3,4,5,6		
	Laboratory reports	(lab performance, reports, test, oral test)	35	CLO 1,2,3,4,5,6		
Required/recommended reading and online materials	Chhabil Dass: Fundamentals of contemporary mass spectrometry (Wiley-Interscience) D.A. Skoog, F.K. Holler, S.R. Crouch: Principles of Instrumental Analysis (Thomson, latest edition)					
Additional Course Information	Reference to published material wi Laboratory classes are mandatory course.			ry reports to pass this		

CHEM4242	Analytic	al chemistry (6 cre	edits)	Academic Year	r 2017	
Offering Department	Chemistry		•	Quota	50	
Course Co-ordinator		, Chemistry (kwanmng	g@hku.hk)		'	
Teachers Involved		(Dr K M Ng, Chemistry)				
Course Objectives	course en bioanalytic	phasizes on the inte	ic principle, practice and methodo gration of analytical concepts and rse will be particularly useful for stunistry.	technologies to solve practi	cal analytical and	
Course Contents & Topics	merits of a	Analytical measurement concepts: Statistical treatment & evaluation of chemical measurement data; F merits of analytical methods; Validation of analytical methods; Quality assurance in chemical analysis ar laboratories				
	preparation separation chromatog on mass s Problem-b knowledge	n and enrichment tech technologies for co- graphic analysis and s pectrometry  ased design of analy and experience related	ractical techniques of sample pr nniques for biomedical, pharmaceumplex mixture analysis (e.g. mul pectroscopic detection; Analytes contical strategy for chemical & bio- ted to selected fields of research;	utical and forensic chemical a tidimensional LC); Derivatiza haracterization and detection chemical analysis: Expert sh	nalysis; Advanced ation methods for techniques based maring of practica	
Course Learning	literature/		course, students should be able to	)·		
Outcomes	CLO 1 ap va CLO 2 de ad	ply statistical methods lidate analytical metho monstrate understand vantages and limitatio	s to assess analytical measuremends and results ling on the working principle of diff	nt data quality and interpret erent analytical techniques a		
Ne venuisites		-		ind bioarialytical problems		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass III C	HEM3241 or CHEM32	.42			
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 -	2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities, logical thinking and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to chemical analysis. Apply highly effective organization and presentation skills as shown in class work.					
	Demonstrate a substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to chemical analysis. Apply effective organization and presentation skills as shown in class work.					
	C	C Demonstrate a general command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and ability to apply knowledge learnt to solve a wide range of complex issues and problems related to chemical analysis. Apply effective organization and presentation skills as shown in class work.  Demonstrate a partial but limited command of knowledge and skills required for attaining some of the course learning outcomes				
	in Food and Water Analysis. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilitie Show limited ability to apply knowledge to solve problems related to chemical analysis. Apply limited or barely effective organization and presentation skill as shown in class work.  Fail  Demonstrate little or no evidence for the command of knowledge and skills required for attaining the course learning outcomes Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve					
		problems related to chemiclass work.	nical analysis. Organization and presentation			
Course Type		th laboratory compone			No of Harris	
Course Teaching Learning Activities	Activities		Details		No. of Hours	
Learning Activities	Lectures	.,	6 v 4 hour of laboratory prostical		24	
	Laborator	у	6 x 4-hour of laboratory practica	ı	24	
	Tutorials	Calf atudy			6	
Announce Marthar J		Self study	B. C. W.	144 . 144	100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examinat	on		70	CLO 1,2,3	
	Laborator	y reports	Experiment & Lab report	10	CLO 1,2	
	Presentat	ion		10	CLO 1,2,3	
	Test			10	CLO 1,2,3	
Required/recommended reading and online materials	edition)		ller, S.R. Crouch: Fundamentals of			
Additional Course					ialesi edilion)	
	Neielelice	Manz, P. S. Dittrich, N. Pamme, D. Iossifidis: Bioanalytical Chemistry (Imperial College Press, latest editieferences to specialist texts and other published materials will be made throughout the course. aboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to p				

CHEM4341	Advanced inorganic chemistry (6 credits)	Academic Year	2017

Offering Department	Chemistry			Quota	80	
Course Co-ordinator		Che, Chemistry (cmc	che@hku.hk)			
Teachers Involved		Che,Chemistry)				
	,	Sun,Chemistry)				
0 Obi	-	W Yam,Chemistry)		to abico forther and areas		
Course Objectives	topics in I	norganic Chemistry a	rom Intermediate Inorganic Chemis and new areas of interest. Problem he course. This course also aims to	based learning on selected a	dvance topics will be	
Course Contents & Topics	bonds, ind	organic and supramo	current interest. Examples includ lecular photochemistry, lanthanide les by metal complexes.			
Course Learning	On succe	successful completion of this course, students should be able to:				
Outcomes	CLO 1 ur	nderstand the princip	les and concepts of inorganic and s	supramolecular photochemisti	гу	
		nderstand the electro letal complexes	onic structure and bondings of nove	el metal-metal and metal-liga	and multiple bonded	
	in		e the activation of small molecules tivation in chemical catalysis of glo			
	CLO 4 ur	nderstand the role of	metal complexes in bio-inorganic a	nd medicinal chemistry		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	ass in CHEM3341				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018	- 2019 · Y	Examination	Dec	
Grade Descriptors	A	Demonstrate thorough I	knowledge and understanding of essential fa	acts, concepts, principles and theorie	es relating to the frontiers	
(A+ to F)	in inorganic chemistry. Show strong ability to apply and integrate knowledge and theory, and strong ability to analyze novel problems in inorganic chemistry. Apply highly effective organizational and presentational skills.					
	B Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles and theories relating to the more advanced knowledge in inorganic chemistry. Show evidence to apply and integrate knowledge and theory, and ability to analyze novel problems of inorganic chemistry. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles and					
	theories relating to the more advanced knowledge in inorganic chemistry. Show evidence of some abilities to apply and integrate knowledge and theory, and to analyze problems to most familiar situations in inorganic chemistry. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles and theories relating to the more advanced knowledge in inorganic chemistry. Show evidence of limited abilities to apply and integrate knowledge and theory, and limited ability to analyze problems to most familiar situations in inorganic chemistry. Demonstrate partially effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles and theories relating to the more advanced knowledge in inorganic chemistry. Show little or no evidence of abilities to apply and integrate knowledge and theory, and little or no ability to analyze problems to most familiar situations in inorganic chemistry. Demonstrate minimally effective organizational and presentational skills.					
Course Type	Lecture-b	ased course				
Course Teaching	Activities	s	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials		including literature survey & pr	resentation	12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		(continuous assessment)	30	CLO 1,2,3,4	
	Examination		(22)	70	CLO 1,2,3,4	
Required/recommended reading and online materials			illo and Bochmann: Advance Inorga	anic Chemistry (Wiley, 1999,		
Additional Course	Reference	es to specialist texts a	and other published materials will be	e made throughout the cours	e.	
Information		are strongly recomn	nended to take CHEM4142 Symme			

CHEM4342	Organometallic chemistry (6 credits)	Academic Year	2017			
Offering Department	Chemistry	Quota	40			
Course Co-ordinator	Prof V W W Yam, Chemistry (wwyam@hku.hk)					
Teachers Involved	(Dr H Y Au-Yeung,Chemistry) (Prof V W W Yam,Chemistry)					
Course Objectives	To give further, more detailed, treatment to organometallic chemistry mentioned in CHEM3341 Inorganic Chemistry II. The course also aims to introduce and familiarize students with advanced laboratory techniques, and to prepare students for graduate work in inorganic and organometallic chemistry.					
Course Contents & Topics	Lectures: Main group and transition metal organometallics. Transition metal cluster chemistry. Bonding, structure and reactivities of organometallics. Application of organometallics in organic synthesis and catalysis.  Laboratory: To introduce and familiarize students with advanced laboratory techniques which include the synthesis and manipulation of air- and moisture- sensitive compounds, and their characterization by various spectroscopic methods.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 understand the advanced principles and concepts in organometallic chemistry					
	CLO 2 demonstrate knowledge and understanding in the bonding, strutransition metal organometallics, especially in transition metal clumetal alkylidynes					
	CLO 3 demonstrate knowledge and understanding in the application polymerization and catalysis	of organometallics in or	ganic synthesis,			
	CLO 4 demonstrate ability in advanced laboratory techniques including moisture- sensitive compounds, and their characterization by vari					
Pre-requisites	Pass in CHEM3341					

(and Co-requisites and Impermissible						
combinations)	Y 1st	sem Offer in 2018 - 20	110 · V	Examination	Dec	
Offer in 2017 - 2018 Grade Descriptors (A+ to F)	A					
	В					
	С	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more detailed and advanced treatment of organometallic chemistry, especially those related to structure, bonding and reactivities of main group and transition metal organometallics; transition metal cluster chemistry; and application of organometallics in organic synthesis and catalysis. Show evidence of some abilities to apply and integrate knowledge and theory relating to the advanced principles and concepts of organometallic chemistry. Show ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the advanced principles and applications of organometallic chemistry. Demonstrate moderately effective advanced laboratory skills and techniques, especially in the synthesis and manipulation of air- and moisture- sensitive compounds and their				
	D	characterization by various spectroscopic methods.  Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more detailed and advanced treatment of organometallic chemistry, especially those related to structure, bonding and reactivities of main group and transition metal organometallics; transition metal cluster chemistry; and application of organometallics in organic synthesis and catalysis. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the advanced principles and concepts of organometallic chemistry. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the advanced principles and applications of organometallic chemistry. Demonstrate partially effective advanced laboratory skills and techniques, especially in the synthesis and manipulation of air- and moisture- sensitive compounds and their characterization by various spectroscopic methods.				
	Fail  Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more detailed and advanced treatment of organometallic chemistry, especially those related to structure, bonding and reactivities of main group and transition metal organometallics; transition metal cluster chemistry; and application of organometallics in organic synthesis and catalysis. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the advanced principles and concepts of organometallic chemistry. Show little or no ability to analyze problems to most familiar situations and erroneous use of data and experimental results to draw appropriate conclusions relating to the advanced principles and applications of organometallic chemistry. Demonstrate minimally effective advanced laboratory skills and techniques, especially in the synthesis and manipulation of air- and moisture- sensitive compounds and their characterization by various spectroscopic methods.					
Course Type	Lecture wi	th laboratory component	t course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures	у			24 30	
	Tutorials				5	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme		(continuous assessment)	30	CLO 1,2,3,4	
	Examinati	on		70	CLO 1,2,3,4	
Required/recommended reading and online materials			c Chemistry of the Transition Me organometallics - A Concise Introd		ised edition)	
Additional Course Information		•	other published materials will be r y. Students must complete ALL	•		

CHEM4441	Advanced organic chemistry (6 credits)  Academic Year 2017					
Offering Department	themistry Quota 80					
Course Co-ordinator	Prof D Yang, Chemistry (yangdan@hku.hk)					
Teachers Involved	(Dr X C Li,Chemistry) (Prof D Yang,Chemistry)					
Course Objectives	To provide students with knowledge in organic chemistry reaction med determination.	chanisms and organic cor	npound structure			
Course Contents & Topics	The course covers chemical bonding, advanced stereochemistry, investigating reaction mechanisms, reactive intermediates, rearrangeme					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 describe, analyze and interpret the structure and reactivity relationship of organic molecules					
	CLO 2 identify and predict the selectivities (chemoselectivity, regiose reactions	electivity and stereoselect	ivity) in organio			
	CLO 3 describe the general approaches to study organic mechanisms					
	CLO 4 have a general understanding and working knowledge of pericyclic reactions, reactive intermediates (radicals, carbenes and nitrenes), and polar rearrangements					
	CLO 5 suggest reasonable mechanistic pathways for some types of organic reactions					
	CLO 6 apply the knowledge of reaction mechanisms in design of synthetic routes for organic compounds					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM3441					
Offer in 2017 - 2018	Y 1st sem Offer in 2018 - 2019 : Y	Examination	Dec			

Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations.					
	В	Demonstrate substantia learning outcomes. Sho	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations.				
	С		Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations.				
	D		e coherent and logical thinking, bu	and skills required for attaining some of the country twith limited analytical and critical abilities. Sh			
	Fail			dge and skills required for attaining the course king. Show very little or no ability to apply knowns.			
Course Type	Lecture	ecture-based course					
Course Teaching	Activities		Details	Details			
& Learning Activities	Lectures						
	Tutorials				12		
	Readir	ng / Self study			100		
Assessment Methods and Weighting	Metho	ds	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Exami	nation		70	CLO 1,2,3,4,5,6		
	Test			30	CLO 1,2,3,4,5,6		
Required/recommended reading and	F.A. Ca 2007.	arey and R.J. Sunberg,	"Advanced Organic Chemis	stry, Part-A: Structure and Mechanisr	n", 5th Ed.: Springer,		
online materials		,, ,	ry", 8th Ed., Thomson Brooks", Oxford University Press	•			

CHEM4443	Integrate	ed organic syl	nthesis (6 credits)	Academic Yea	r 2017		
Offering Department	Chemistry		· · · · · · · · · · · · · · · · · · ·	Quota	50		
Course Co-ordinator	Prof P Chi	Prof P Chiu, Chemistry (pchiu@hku.hk)					
Teachers Involved		(Prof P Chiu, Chemistry)					
Course Objectives	products, advanced	To introduce aspects of modern organic reactions with relevance to and in the context of the synthesis of natura products, drugs and medicinal chemistry to provide an integrated approach to the subject, and to provide training in advanced organic laboratory skills, and further hands-on experience in synthesis and characterization, as preparation for graduate studies or research in organic chemistry.					
Course Contents & Topics	Building of present m molecules these mole their med retrosynth	Building on the organic chemistry covered in the foundational courses CHEM1003 and CHEM2402, this course will present modern synthetic methods and synthetic planning. The course is organized into units based on target drug molecules. In each unit, the chemical biology of these compounds are briefly presented and the syntheses of these molecules are introduced, accompanied by in-depth discussions of the reactions involved with emphasis on their mechanisms, selectivity, stereochemistry, scope and limitations. Concept of synthetic design including retrosynthetic analysis, stereoselectivity and enantioselective control elements will be emphasized. A laboratory section provides training in the practical skills of synthesis.					
Course Learning			•	le to:			
Outcomes	CLO 1 un ch CLO 2 ab CLO 3 pe ex	On successful completion of this course, students should be able to:  CLO 1 understand the rationale, selectivities, and mechanisms of various reactions and reagents in organic chemistry  CLO 2 able to solve mechanistic and synthetic chemistry problems  CLO 3 perform organic synthesis experiments at an increased level of technical difficulty, using additional skills in experimental design and execution, spectroscopic analysis, and reporting of results  CLO 4 integrate lecture material and literature search, to learn chemistry independently					
Pre-requisites			aterial and literature search, to learn	onemistry independently			
and Co-requisites and Impermissible combinations)	Pass in Cl	Pass in CHEM3441; or Pass in CHEM3441 (without lab component) and CHEM3443					
Offer in 2017 - 2018	Y 2nd		2018 - 2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	В	mechanisms relate to analyze novel sy solution of novel a techniques in synth Demonstrate a sub to synthetic organic synthetic organic c novel and most far	estantial command of knowledge and understa c chemistry. Show evidence of ability to inte- hemistry situations and problems. Show a co- miliar synthetic problems. Demonstrate effect	ng ability to integrate knowledge and theo lems. Show a critical use of knowledge a e highly effective organization and applic inding of concepts, principles, reactions a grate knowledge and theory, and evideno rrect use of knowledge and data to apply	ory, and a strong ability and data to apply to the cation of lab skills and mechanisms related to the solution of some to the solution of some to the solution of some the categories.		
	С	synthetic experiments.  Demonstrate a general but incomplete command of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show evidence of some ability to integrate knowledge and theory, and evidence of some ability to analyze synthetic organic chemistry situations and problems. Show a correct use of knowledge to apply to the solution of most familiar problems. Demonstrate moderately effective organization and application of lab skills and techniques in synthetic experiments.					
	D	Demonstrate a partial but limited command of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show evidence of a limited ability to integrate knowledge and theory, and a limited ability to analyze familiar situations and problems. Show some correct but erroneous use of knowledge to apply to the solution of most familiar problems. Demonstrate partially effective organization and application of lab skills and techniques in synthetic experiments.					
	Fail	Demonstrate little mechanisms relate synthetic organic c of knowledge to ap	or no evidence of command of knowledged to synthetic organic chemistry. Show little hemistry, and little or no ability to analyze mopply to the solution of familiar problems. Demos in synthetic experiments.	or no evidence of ability to integrate knowst familiar situations and problems. Show	owledge and theory in mostly erroneous us		
Course Type	Lecture wi	th laboratory con	·				
Course Teaching	Activities	•	Details		No. of Hours		
•	Lectures	-			24		
& Learning Activities	Lootaroo						
a Louising / totavitioo	Laborator	V			25		
2 20011111g / 1011111100	Laborator	Self study			25 100		

and Weighting			course grade (%)	Methods to CLO Mapping
	Examination		65	CLO 1,2
	Laboratory reports		25	CLO 1,2
	Test		10	CLO 3,4
Required/recommended reading and online materials	Reference Books: Organic synthes Top drugs, top synthetic routes, J.			
Additional Course Information	Laboratory classes are mandatory course.	. Students must complete ALL exp	periments and laboratory	reports to pass this

CHEM4444	Chemica	al biology (6 credits	3)	Academic Ye	ar 2017			
Offering Department	Chemistry		•	Quota	50			
Course Co-ordinator	Dr X C Li,	Chemistry (xuechenl@	hku.hk)					
Teachers Involved	(Dr X C Li	,Chemistry)	·					
Course Objectives				e biological systems to study nat				
	_	enerate new functional molecules. Useful as an introduction to research in areas of chemical biology, medici nemistry and biotechnology.						
Course Contents & Topics	Chemical	nemical biology of nucleic acids, protein chemistry, protein posttranslational modifications, carbohydrate						
Course Learning		emistry, chemical glycobiology and tools and techniques in chemical biology.  n successful completion of this course, students should be able to:						
Outcomes			ogy approaches in studying b					
24.0000				produce natural biomolecules and	new biomolecules			
	wi	ht altered functions	•		The Blancia and			
	CLO 3 co	empare chemical biology	, and traditional biology appr	oaches in drug discovery				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	ass in BIOC3601 or CHEM3441						
Offer in 2017 - 2018	Y 2nd	l sem Offer in 2018 - 2	2019 : Y	Examination	May			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources							
	and to quote/reference aptly.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly.							
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly.							
	D							
	Fail	Demonstrate little or no evid of analytical and critical a	dence of command of knowledge at bilities, logical and coherent think d presentational skills are minimally	nd skills required for attaining the course ing. Show very little or no ability to ap effective or ineffective. Limited use of se	ply knowledge to solve			
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Lectures				36			
	Tutorials		tutorials/discussion		12			
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examination			60	CLO 1,2,3			
	Test		tt- 0ti	- 10				
	Test		tests & presenations	40	CLO 1,2,3			
Required/recommended reading and online materials		ns of Chemical Biology	by C.M. Dobson, J.A. Gerral		CLO 1,2,3			
reading and		ns of Chemical Biology	·		CLO 1,2,3			

CHEM4541	Physical chemistry III: statistical thermodynamics and kinetics theory (6 credits)	Academic Year	2017		
Offering Department	Chemistry	Quota	40		
Course Co-ordinator	, Chemistry ()				
Teachers Involved					
Course Objectives	The course presents fundamental principles and topics on statistical thermodynamics and kinetic theory in order to provide a solid foundation for students intending to further their studies in physical chemistry and related fields.				
Course Contents & Topics	Principles of Statistical Thermodynamics  - Thermodynamic laws  - Ensembles and partition functions: microcanonical, canonical and grand-cal  - Systems of independent molecules: ideal gas  - Molecular degrees of freedom: translation, rotation, vibration, and electronic  - Ideal gas mixture: chemical equilibrium, binding, and titration				

		Lattice statistics: Ising model and phase transition Quantum statistics				
	Chemical equilibrium and kinetics theory - Rate theory: collision theory, transition state theory					
Course Learning Outcomes	CLO 1 un	derstand and use the te	ourse, students should be able to: rminology and nomenclature in stati	,		
			nd understanding of basic concepts i	•		
Pre-requisites (and Co-requisites and Impermissible combinations)		LO 3 understand correlation between macroscopic observables and microscopic statistical model systems ass in CHEM3541				
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N		Examination		
Grade Descriptors (A+ to F)	Α		advanced level of extensive knowledge of ong analytical / critical abilities and logical th			
	B Substantial command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical / critical abilities and logical thinking. Understand the scope of Physical Chemistry questions that can be applied with the knowledge.					
	C General but incomplete command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical thinking. Can apply the knowledge to familiar situations.  Partial but limited command of knowledge of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate					
	Partial but limited command of knowledge of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate limited evidence of analytical thinking. Understand the question to be solved with knowledge.    Fail   Little or no evidence of command of knowledge of statistical thermodynamics and reaction dynamics.					
Course Type		th laboratory component		ilos and reaction dynamics.		
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures			24		
_	Laborator	V			24	
	Tutorials				6	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	continuous assessment of on class quizzes & assignments	40	CLO 1,2,3	
	Examinat	ion		60	CLO 1,2,3	
Required/recommended reading and online materials		An introduction to Statist Physical Chemistry	ical Thermodynamics			
Additional Course Information	Laboratory course.	y classes are mandatory	v. Students must complete ALL exp	eriments and laboratory	reports to pass this	

CHEM4542	Compu	Computational chemistry (6 credits)  Academic Year   201					
Offering Department	Chemistr	Chemistry Quota 60					
Course Co-ordinator	Prof G H	Chen, Chemistry (ghc@	)yangtze.hku.hk)				
Teachers Involved							
Course Objectives	methods.	This course covers topics in computational chemistry including first-principles methods and molecular dynamics methods. It is offered to undergraduate and postgraduate students interested in computational chemistry, computational physics and computational biology.					
Course Contents & Topics		Hartree-Fock molecular orbital method, density-functional theory, time-dependent methods, Basis sets, Force Fields, QM/MM method, free energy calculation, and computer-aided drug design.					
Course Learning	On succe	essful completion of this	course, students should be able to:				
Outcomes	CLO 1 u	nderstand the basic con	cepts of density-functional theory				
		nderstand the basic nechanics/molecular me	numerical techniques of molec chanics method	ular mechanics method	and quantum		
			nputational software to calculate th le organic molecules, inorganic mate		perties of various		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	Pass in CHEM3541 or PHYS3351					
Offer in 2017 - 2018	N Of	fer in 2018 - 2019 : Y		Examination			
Grade Descriptors	Α	Mastery of advanced know	wledge on following topics: density-functional		ime-dependent density		
(A+ to F)		functional theory, open sys	stem, molecular dynamics, force field, and qua				
	В	functional theory, open sys and critical abilities and log Substantial command of a dependent density-functio	stem, molecular dynamics, force field, and qua jical thinking, with strong ability to apply knowled broad range of knowledge on following topic and theory, open system, molecular dynamalytical and critical abilities and logical thinking	edge to practical problems in physics: density-functional theory, Kohnics, force field, and quantum	sical chemistry. n-Sham equation, time mechanics/molecular		
		functional theory, open sys and critical abilities and log Substantial command of a dependent density-functio mechanics. Evidence of an physical chemistry. Command of knowledge o theory, open system, mo	ical thinking, with strong ability to apply knowled broad range of knowledge on following topic anal theory, open system, molecular dynar	edge to practical problems in phy- is: density-functional theory, Koh nics, force field, and quantum g, with ability to apply knowledge (Cohn-Sham equation, time-depen mechanics/molecular mechanic	sical chemistry.  n-Sham equation, time mechanics/molecular to practical problems in dent density-functional ss. Evidence of some		
	В	functional theory, open sys and critical abilities and log Substantial command of a dependent density-functio mechanics. Evidence of an physical chemistry. Command of knowledge o theory, open system, mo analytical and critical abiliti Partial but limited comman density-functional theory,	ical thinking, with strong ability to apply knowledge on following topic inal theory, open system, molecular dynamialytical and critical abilities and logical thinking in following topics: density-functional theory, be lecular dynamics, force field, and quantum es and logical thinking, with ability to apply knowledge on following topics: density-force system, molecular dynamics, force to analytical and critical abilities and logical thinking, with a company to the control of the co	edge to practical problems in phy- is: density-functional theory, Koh nics, force field, and quantum g, with ability to apply knowledge Kohn-Sham equation, time-depen mechanics/molecular mechanics will apply to familiar problems in prunctional theory, Kohn-Sham eq field, and quantum mechanics/	sical chemistry.  n-Sham equation, time mechanics/molecular to practical problems in  ident density-functiona s. Evidence of some nysical chemistry.  uation, time-dependent molecular mechanics.		
	В	functional theory, open sys and critical abilities and log Substantial command of a dependent density-functio mechanics. Evidence of an physical chemistry. Command of knowledge o theory, open system, mo analytical and critical abiliti Partial but limited commandensity-functional theory, Evidence of some coheren problems in physical chem Little or no evidence of dependent density-functio	ical thinking, with strong ability to apply knowle- broad range of knowledge on following topic inal theory, open system, molecular dynar ialytical and critical abilities and logical thinking in following topics: density-functional theory, is lecular dynamics, force field, and quantum es and logical thinking, with ability to apply knowledge on following topics: density-fopen system, molecular dynamics, force it analytical and critical abilities and logical thi istry. command of knowledge on following topics: inal theory, open system, molecular dynamical and critical abilities and logical thinking, w	edge to practical problems in phy- s: density-functional theory, Koh nics, force field, and quantum g, with ability to apply knowledge Kohn-Sham equation, time-depen mechanics/molecular mechanic owledge to familiar problems in pl unctional theory, Kohn-Sham eq field, and quantum mechanics/ nking, with limited ability to apply density-functional theory, Kohr nics, force field, and quantum	sical chemistry.  n-Sham equation, time mechanics/molecular to practical problems in oddent density-functional is. Evidence of some hysical chemistry. uation, time-dependent mechanics, knowledge to practical n-Sham equation, time mechanics/molecular		
	B C D	functional theory, open sys and critical abilities and log Substantial command of a dependent density-functio mechanics. Evidence of an physical chemistry. Command of knowledge o theory, open system, mo analytical and critical abiliti Partial but limited comman density-functional theory, Evidence of some coheren problems in physical chem Little or no evidence of i dependent density-functio mechanics. Lack of analyti	ical thinking, with strong ability to apply knowledge on following topic inal theory, open system, molecular dynarialytical and critical abilities and logical thinking in following topics: density-functional theory, belecular dynamics, force field, and quantum es and logical thinking, with ability to apply knowledge on following topics: density-fopen system, molecular dynamics, force it analytical and critical abilities and logical thinking.  Command of knowledge on following topics: density-fopen system, molecular dynamics, force it analytical and critical abilities and logical thinking. It is theory, open system, molecular dynamical and critical abilities and logical thinking, wistry.	edge to practical problems in phy- s: density-functional theory, Koh nics, force field, and quantum g, with ability to apply knowledge Kohn-Sham equation, time-depen mechanics/molecular mechanic owledge to familiar problems in pl unctional theory, Kohn-Sham eq field, and quantum mechanics/ nking, with limited ability to apply density-functional theory, Kohr nics, force field, and quantum	sical chemistry.  n-Sham equation, time mechanics/molecular to practical problems in oddent density-functional is. Evidence of some hysical chemistry. uation, time-dependent mechanics, knowledge to practical n-Sham equation, time mechanics/molecular		

& Learning Activities	Lectures			24	
	Laboratory	lab sessions 6x4 hours of compu	lab sessions 6x4 hours of computational laboratory		
	Tutorials		•	6	
	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments	(continuous assessment)	40	CLO 1,2,3	
	Examination		60	CLO 1,2,3	
Required/recommended reading and online materials	Attila Szabo & Neil S. Ostlund: Modern Quantum Chemistry (1st ed.) Robert G. Parr & Weitao Yang: Density-Functional Theory of Atoms and Molecules J.M. Haile: Molecular Dynamics Simulation Andrew R. Leach: Molecular Modelling - Principles and Applications				
Additional Course Information	This course is equivalent to CHEM CHEM4542 is offered every other Laboratory classes are mandator course.		experiments and laboratory	reports to pass this	

CHEM4543	Advance	ed physical chemist	ry (6 credits)	Academic Yea	ar 2017	
Offering Department	Chemistry			Quota	40	
Course Co-ordinator	Prof G H	Chen, Chemistry (ghc@)	/angtze.hku.hk)			
Teachers Involved	,	Phillips,Chemistry) Chen,Chemistry)				
Course Objectives		•	cs in physical chemistry. It is offer din postgraduate studies.	red for students majoring ir	n physical chemistry	
Course Contents & Topics		s, chemical reaction me	ods, excited states and reactive in echanisms, advanced quantum n			
Course Learning	On succes	ssful completion of this c	ourse, students should be able to:			
Outcomes	CLO 1 ur	nderstand the basic cond	epts of quantum chemistry, statisti	cal thermodynamics and m	olecular dynamics	
		nderstand Hartree-Fock ynamics	method, statistical ensembles, of	quantum statistics, H-theo	rem, and reaction	
	CLO 3 ur	nderstand the elementary	/ numerical procedures in Hartree-	Fock and molecular mecha	nics methods	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	HEM3541				
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A					
	B Substantial command of a broad range of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Evidence of analytical and critical abilities and logical thinking, with ability to apply knowledge to practical problems in physical chemistry.					
	Command of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Evidence of some analytical and critical abilities and logical thinking, with ability to apply knowledge to familiar problems in physical chemistry.					
	Partial but limited command of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Evidence of some coherent analytical and critical abilities and logical thinking, with limited ability to apply knowledge to practical problems in physical chemistry.					
	Fail  Little or no evidence of command of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Lack of analytical and critical abilities and logical thinking, with very little or no ability to apply knowledge to practical problems in physical chemistry.					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	5	Details	No. of Hours		
& Learning Activities	Lectures			36		
-	Tutorials		tutorials/discussion		12	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		(continuous assessment)	20	CLO 1,2,3	
	Examination		i i	80	CLO 1,2,3	
Required/recommended reading and online materials	P. W. Atkins: Physical Chemistry Ira N. Levine: Quantum Chemistry R. C. Tolman: The Principles of St					
Course Website	Nil		•			
Additional Course Information	Nil					

CHEM4544	Electrochemical science and technology (6 credits)	Academic Year	2017		
Offering Department	Chemistry	Quota	36		
Course Co-ordinator	Prof G K Y Chan, Chemistry (hrsccky@hku.hk)				
Teachers Involved					
Course Objectives	To understand the science of electrochemistry, methods to characterise electrochemical cells, and factors affecting electrochemical applications and technologies.				
Course Contents & Topics	Thermodynamics, kinetics, and transport of electrochemical processes. Electrochemical characterization by controlled potential, current, and hydrodynamics. Voltammetry for analytical chemistry. Electrochemical power sources, sensors, synthesis and separation processes. Electrolytes, separators, and electrode materials. Models of electrochemical processes.				

Course Learning	On succ	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 Understand the thermodynamic and kinetics of a charge transfer process at the electrode-electrolyte					
	interface and transport of relevant species in molecular and macroscopic scales.					
	CLO 2	Apply voltammetry methor	ods to characterize an electrochem	nical process.		
	CLO 3	Correlate performance of	electrochemical cells to materials	, design, and operation par	ameters.	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM3542					
Offer in 2017 - 2018	Y 2r	nd sem Offer in 2018 -	2019 : N	Examination	n May	
Grade Descriptors (A+ to F)	A Demonstrate thorough knowledge of electrochemical science and technology, and mastery of skills required for attaining all of the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to solve problems in a wide range of complex, familiar and unfamiliar situations. Critical use of data and sourcing of references. Apply highly effective organizational and presentational skills.					
	В	least most of the course le apply knowledge to solve	nowledge of electrochemical science and sarning outcomes. Show evidence of analy problems in familiar and some unfamiliar nal and presentational skills.	tical and critical abilities and log	ical thinking, and ability to	
	C Demonstrate general but incomplete knowledge of electrochemical science and technology and command of skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge solve problems to most familiar situations. Mostly correct but some erroneous use of data and references. Apply moderately effective organizational and presentational skills.					
	Demonstrate partial but limited knowledge of electrochemical science and technology and command of skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited ability to use data and source references. Apply limited or barely effective organizational and presentational skills.					
	Fail	attaining the course learning	ridence of knowledge of electrochemical s ng outcomes. Lack of analytical and critica dge to solve problems. Misuse of data a active.	al abilities, logical and coherent the	ninking. Show very little or	
Course Type	Lecture	with laboratory compone				
Course Teaching	Activitie	es	Details	No. of Hours		
& Learning Activities	Lectures	S		24		
	Laborat	ory	Laboratory/Project	24		
	Tutorials	S		6		
	Reading	g / Self study		100		
Assessment Methods and Weighting	Method	İs	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	ation		70	CLO 1,2,3	
	Laborat	ory reports	Laboratory or Project Report/Term Paper	10	CLO 1,2,3	
	Test		Test/Quiz	20	CLO 1,2,3	
Required/recommended reading and online materials	ISBN 97 Bard, All	8047071045.	A. B. Bond, Electrochemical Scie . Electrochemical Methods: Funda	•		

CHEM4910	Chemistry literacy and research (6 credits)  Academic Year 2				2017			
Offering Department	Chemistry Quota							
Course Co-ordinator	Dr X Li,	Dr X Li, Chemistry (xiangli@hku.hk)						
Teachers Involved	(Various	(Various teachers in the Department, Chemistry)						
Course Objectives		This course is designed for final year students who would like to gain experience on research methods and techniques by working on small projects on literature research and chemistry research.						
Course Contents & Topics	The course provides training on chemistry literature research techniques. Students will work on a small project or literature research and a short laboratory-based research project. Thelaboratory-based projects are provided by the students' supervisorswho are assigned by the department.							
Course Learning	On succ	cessful comple	tion of this cours	e, students should be	e able to:			
Outcomes	CLO 1	demonstrate k	nowledge of aca	demic databases and	d search engines of	chemistry literature	9	
	CLO 2	understand the	e terminology and	nomenclature asso	ciated with their own	research project		
		demonstrate keep their own rese		nderstanding of the	chemical technique	s they used to do	the research in	
	CLO 4 demonstrate knowledge and understanding of the results of their own research project and its context in the broader research area							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major including CHEM3241, and CHEM3341, and CHEM3441, and CHEM3541. This capstone course is for Chemistry Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.							
Offer in 2017 - 2018			r in 2018 - 2019 :		, <b>,</b>	Examination	No Exam	
Grade Descriptors (A+ to F)	A	some origina sources. Criti of a wide rar	ity. Illuminating utiliza cal employment of da ge of appropriate the	ation and critical analysis ata and results to synthes eories, principles, data ar	Demonstrate very able an / evaluation of informatior ize appropriate and illuminal methods. Employ very I work beyond that is requ	n acquired from a wide nating conclusions. De effective organization	range of high quality monstrate integration al and presentational	
	B Show a substantial comprehension of the research project. Demonstrate able analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose meaningful comparisons between different secondary interpretations. Correct utilization of data and results to form appropriate conclusions. Compose general integration of theories, principles, data and methods. Perform effective organizational and presentational skills.							
	Show a general but incomplete comprehension of the research project. Presence of some analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose comparisons between different interpretations. Mainly correct but some incorrect utilization of data and results to form appropriate conclusions. Demonstrate some partial integration of theories, principles, data and methods. Perform moderately effective organizational and presentational skills.							
	D	some cohere	nt and logical thinkin mostly via summary	ng, but with limited analy instead of by analysis a	of some relevant inform rtical and critical abilities. and comparison. Limited	Show utilization and ability to employ data	reference of several and results to form	

	coherent think results and/or	r little or no comprehension of the research project. Evidence of little or lack of analytical and critical a rent thinking. Limited employment of secondary sources and no critical comparison of them. Incorrect its and/or unable to form appropriate conclusions. Demonstrate little or no integration of theories, pr ods. Organization and presentational skills are of very limited use or ineffective.				
Course Type	Project-based course					
Course Teaching	Activities	Details	Details			
& Learning Activities	Reading / Self study	12 hrs tutorials; 46 hrs of w reading/self study	12 hrs tutorials; 46 hrs of workshops and 100 hrs reading/self study			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral presentation		50	CLO 1,2,3,4		
	Research report		50	CLO 1,2,3,4		
Required/recommended reading and online materials	Reading materials will be assigned depending on the project.					
Additional Course Information	Satisfactory completion of this course will be counted towards the Capstone requirement.					

CHEM4911	Capstone experience for chemistry undergraduates:  HKUtopia (6 credits)  Academic Ye				r 2017		
Offering Department	Chemistry Quota						
Course Co-ordinator	Dr A P L Tong, Chemistry (apltong@hku.hk)						
eachers Involved	(Various teachers in the Department, Chemistry)						
Course Objectives	This project-based course with the theme of Chemistry for a Better Living in a Foreseeable Future aims to provide students with a capstone experience. It aims to enable students to think what are the key issues the world is facing with that have to be solved by chemistry and related technology. Students will need to apply what they have learn in classroom and conduct literature search regarding advanced chemistry research and related technology under development to solve the problems identified in their project using various channels.						
Course Contents		•	cted that students are actively engaged ar		0 hours to working		
a Topics	on this project.  Students will work in groups of two or three, under the supervision of the course coordinator. The duration of the project will be two to three months. The time of running this project-based course is in the summer (May - August						
Course Learning Outcomes	CLO 1 o	bserve and evaluate sed to solve the prob		•	n chemistry can b		
	CLO 3 w	ork in a team and to	ractice, and to understand limitations of th collaborate with people with different back	ground			
			s effectively in both written and oral forms				
			, critical thinking and creativity	man to our daily life			
Pre-requisites and Co-requisites and Impermissible combinations)	CLO 6 advocate to others the appreciation for chemistry as to its relevance to our daily life  Students are expected to have satisfactorily completed all introductory chemistry disciplinary core courses and a least 24 credits of advanced level disciplinary core/elective chemistry courses in the Chemistry Major.  Students who are interested in taking the course should contact the course coordinator for application in April May. Late application may not be considered.  This capstone course is for Chemistry Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.						
Offer in 2017 - 2018		immer Offer in 2018	•	Examination	No Exam		
Grade Descriptors	<b>A</b>		grasp of the subject. Show strong analytical and o				
(A+ to F)	to quote/reference apity. Critical use of data and results to draw appropriate and insightful conclusions. Show integration of the full range of appropriate theories, principles, evidence and techniques. Apply highly effective organizational and presentations skills. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]  B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use o relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Show general integration of theories, principles, evidence and techniques. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Show some partial integration of theories, principles, evidence and techniques. Apply moderately effective organizational and presentations.						
	skills.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Show limited integration of theories, principles, evidence and techniques. Apply limited or barely effective organizational and presentational skills.						
	Fail	analytical and critical a them. Misuse of data a	of little or no grasp of the knowledge and unders abilities, logical and coherent thinking. Limited use nd results and/or unable to draw appropriate conclus d techniques. Organization and presentational skills	of secondary sources and no sions. Show little or no or inapt	critical comparison integration of theorie		
Course Type	Project-b	ased course					
ourse Teaching	Activitie		Details		No. of Hours		
Learning Activities	Meeting with supervisor		Tutorials		10		
	Reading / Self study				60		
	Assessment		Group work or project		70		
ssessment Methods nd Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Oral pres	sentation	40% Presentation; 10% Participation; 10% Peer evaluation	60	CLO 1,2,3,4,5,		
	Research report			40	CLO 1,2,4,5,6		

online materials	
Additional Course	Enrolment of this course is not conducted via the online course selection system and should be made through the
Information	relevant Department/School office after approval has been obtained from the course coordinator.

CHEM4966	Chemist	ry internship (6 cr	edits)	Academic Yea	ar 2017		
Offering Department	Chemistry						
Course Co-ordinator	Dr H Y Au-Yeung, Chemistry (hoyuay@hku.hk)						
Teachers Involved	(Dr H Y Au-Yeung, Chemistry)						
Course Objectives	This course aims to offer students the opportunities to gain work experience in the industry related to their major of study. The workplace learning experience would be of great benefits to the students to apply their knowledge gained in the study to the real work environments. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the School/Departments.						
Course Contents & Topics	<ul> <li>Within the University: The student will be supervised by a staff member (Supervisor), working on a project of various tasks as instructed by the Supervisor.</li> <li>Outside the University: The student will work in an external agency related to the major of study. The student will be supervised under a staff member of the external agency (the External Supervisor) and a staff member of the Department/School of the student (the Internal Supervisor). The work to be performed by the student will normally be instructed by the External Supervisor, with prior agreement of the Internal Supervisor.</li> </ul>						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1	apply knowledge in the	eir major study in solving practical pro	blems in the work place			
	CLO 2	gain first hand work ex	sperience in the industry related to the	eir major study			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major.  This capstone course is for Chemistry Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.						
Offer in 2017 - 2018	Y 1st	sem 2nd sem Sum	nmer Offer in 2018 - 2019 : Y	Examination	No Exam		
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job of assigned by supervisor(s), Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grad of "Distinction".  Fail Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or assigned by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or						
Course Type	Internship	evaluation by supervisor(s	5), 610.				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Internship work		it is expected that students are to work at least 160 hours (or the equivalent of 4 weeks full-time)		160		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Written report		written report, employer's feedback and oral presentation	100	CLO 1,2		
Additional Course Information	Satisfactory completion of this course can be counted towards the Capstone requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on "Pass/Fail" basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.						

CHEM4999	Chemistry project (12 credits)  Academic Year 20							
Offering Department	Chemistry	Quota						
Course Co-ordinator	Dr J Y Tang, Chemistry (jinyao@hku.hk)							
Teachers Involved	(Various teachers in the Department, Chemistry)							
Course Objectives	To provide experience of research techniques by working on a short project under the direct supervision of a member of staff. This course would prepare students for graduate school work in chemistry.							
Course Contents & Topics	A short research project provided by a member of staff (e.g. the students supervisor).							
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 understand the terminology and nomenclature associated with their	r own research chemist	ry project					
	CLO 2 demonstrate knowledge and understanding of the chemical techniques they used to do the research in their own chemical project							
	CLO 3 demonstrate critical thinking skill in their own research project and understanding the motivation and target of the research							
	CLO 4 demonstrate knowledge and understanding of the results of their own chemistry project and its context in the broader research area							
	CLO 5 demonstrate ability to integrate the knowledge acquired from previous courses and develop fundamental knowledge of designing research plan							
Pre-requisites (and Co-requisites and Impermissible	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major including CHEM3241, and CHEM3341, and CHEM3441, and CHEM3541. This capstone course is for Chemistry Major students only.							
combinations)	The earliest that a student is allowed to take this capstone course is their y	rear 3 study.						
Offer in 2017 - 2018	Y Year long Offer in 2018 - 2019 : Y	Examination	No Exam					
Grade Descriptors (A+ to F)	A Show an extensive comprehension of the research project. Demonstrate very a some originality. Illuminating utilization and critical analysis / evaluation of infor sources. Critical employment of data and results to synthesize appropriate and of a wide range of appropriate theories, principles, data and methods. Emplo skills. [Work of A+ should demonstrate substantial additional work beyond that	rmation acquired from a wide d illuminating conclusions. De by very effective organizations	range of high quality monstrate integration al and presentationa					
	B Show a substantial comprehension of the research project. Demonstrate able information from sources. Demonstrate ability to compose meaningful compar Correct utilization of data and results to form appropriate conclusions. Compo and methods. Perform effective organizational and presentational skills.	analytical and critical thinking isons between different seco	with use of relevant ndary interpretations.					

	C Show a general but incomplete comprehension of the research project. Presence of some analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose comparisons between different interpretations. Mainly correct but some incorrect utilization of data and results to form appropriate conclusions. Demonstrate some partial integration of theories, principles, data and methods. Perform moderately effective organizational and presentational skills.  D Show a partial but limited comprehension, with knowledge of some relevant information, of the research project. Presence of some coherent and logical thinking, but with limited analytical abilities. Show utilization and reference of several sources, but mostly via summary instead of by analysis and comparison. Limited ability to employ data and results to form appropriate conclusions. Demonstrate limited integration of theories, principles, data and methods. Perform limited or marginally effective organizational and presentational skills.						
	Fail	Fail  Show little or no comprehension of the research project. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited employment of secondary sources and no critical comparison of them. Incorrectly utilize data and results and/or unable to form appropriate conclusions. Demonstrate little or no integration of theories, principles, data and methods. Organization and presentational skills are of very limited use or ineffective.					
Course Type	Project-ba	sed course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Reading / Self study		8 hours per week for 24 weeks of meetings	192			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Dissertation including a written report and an oral presentation 100 CLO 1,2,3,4,5						
Required/recommended reading and online materials	Specialist texts dependant on the selected topic.						
Additional Course Information	Third year students with exceptional academic achievement may also apply for this course						

CSCI9001	Practica	Practical Chinese for science students (6 credits)  Academic Year						
Offering Department	Chinese			Quota				
Course Co-ordinator	Mr K W W							
Teachers Involved	(Dr K T La (Dr S F La	chan,Chinese) am,Chinese) ee,Chinese) Vong,Chinese)						
Course Objectives	students announce	to master the techniqu ments, notice, brochures s, the style and rhetor	students' competence using Chinese es of writing different types of do s, leaflets, and reports. In addition, to ic of reader-based writings are inc	cuments such as memo opics addressing resentat	s, emails, letters, ion and discussion			
Course Contents & Topics	good-new	s and goodwill messag documents: emails; p	n Chinese - The Chinese writing systems, bad-news messages, and person resentations - Styles and rhetoric	uasive messages - Tecl	hniques of writing			
Course Learning Outcomes	CLO 1 de	evelop a balanced compe	ourse, students should be able to: etency in modern Chinese and write vand stylistics, as well as practical write		discipline			
	CLO 4 ap	pply their disciplinary kno	nmunication, initiate discussions and obviledge and their Chinese writing skil creatively in different social or profess	lls and professional prese				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL	, , , , , , , , , , , , , , , , , , , ,						
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offer i	in 2018 - 2019 : Y	Examination	Dec May			
Grade Descriptors (A+ to F)	A The student acquired a superb ability to achieve the intended learning outcomes of the course at all levels of learning: apply, evaluate, and synthesize the language techniques for effective communication in all situations.  B The student acquired the ability to achieve the intended learning outcomes of the course at all levels of learning: descrit evaluate, and synthesize the language techniques for effective communication in most situations.  C The student acquired adequate ability to achieve the intended learning outcomes of the course at low levels of lear describe and apply the language techniques for effective communication) but not at high levels of learning (i.e. eval synthesize the language techniques for effective communication).  D The student only has basic familiarity with the subject.							
	Fail	The student has very limited	familiarity with the subject.					
Course Type		ased course						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Lectures			12				
	Tutorials		Small group tutorials	12				
	Group wo		Workshops	24				
	Discussio			24				
		Self study	Reading/self study (20 hours) and p	32				
Assessment Methods and Weighting	Assessme Methods	ent	Details	Weighting in final course grade (%)	16 Assessment Methods to CLO Mapping			
	Assignments		Self-access & online exercises (40%) and Tutorial disscussion (10%)	50	to one mapping			
	Examinat	ion		50				
Required/recommended reading and online materials	港:香港之場章 包含	大學出版社。香港城市大 996年。《中文應用寫作 · 汪麗炎·1998年。《漢 篇》。香港:香港城市大	上海:上海大學出版社。李家樹、謝學語文學部·2001年。《中文傳意:教程》。香港:三聯書店。李錦昌:語寫作》。上海:上海大學出版社。學出版社。經文略、蘭德主編·2001 《新編公文寫作學》。成都:四川人	基礎篇》。香港:香港城市 2000年。《現代商業傳意 香港城市大學語文學部・2 年。《企業文案撰寫模式	市大學出版社。周 大全》。香港:商 2001年。《中文傳 大全》。廣州:廣			

EASC1020	Introdu	ction to climate scie	nce (6 credits)	Academic	Year	2017	
Offering Department	Earth Sciences Quota						
Course Co-ordinator	Dr Z H Li	or Z H Liu, Earth Sciences (zhliu@hku.hk)					
Teachers Involved	`	Li,Earth Sciences) Liu,Earth Sciences)					
Course Objectives	controls	of temporal and spatial al record. We look at mo	variations in earth's climat	climate systems and climate te and its histories of past clin tat are used in paleoclimatic a	ates	preserved in the	
Course Contents & Topics	geologic	time, external and intern	al forcing mechanisms, so	bility of climate, physical cause lar orbital variations, major clim I and interglacial oscillations, p	atic e	events of the pas	
Course Learning	On succe	essful completion of this of	course, students should be	able to:			
Outcomes	CLO 1	identify major aspects of	of climatology and approacl	nes to climatological study			
	CLO 2	explain the factors and	physical processes control	ling climate system			
	CLO 3	understand the driving	forces of Earth's climate ch	ange			
	CLO 4	-	f Earth's climate change	ŭ			
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL	0" : 22/2					
Offer in 2017 - 2018 Grade Descriptors	Y 2n	d sem Offer in 2018 - 2		Examination   Ex		May	
	knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate critical use of data and results to draw appropriate and insightful conclusions. Show insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate correct use of data and results to draw appropriate conclusions. Show critical use of relevant information from sources and ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Demonstrate mostly correct but some erroneous use of data and results to draw appropriate conclusions. Show use of relevant information from sources and ability to make comparisons between different interpretations and to quote/reference aptly.						
	D Fail	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Demonstrate limited ability to use data and results to draw appropriate conclusions. Show use and reference of several sources, but mainly through summary rather than analysis and comparison.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack					
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate misuse of data and results and/or unable to draw appropriate conclusions. Show limited use of secondary sources and no critical comparison of them.						
Course Type		pased course					
Course Teaching	Activitie		Details			No. of Hours	
& Learning Activities	Lectures					36	
	Tutorials					12	
	Project v	vork				36	
	Reading / Self study					50	
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)		Assessment Methods to CLO Mapping	
	Assignm			25		CLO 2,3	
	Examina			50		CLO 1,2,3,4	
	Project re	eports		25		CLO 1,4	
Required/recommended reading and online materials			Past and Future (W. F. Freega: Climatology (Jones an	eeman, 2008, 2nd edition) d Bartlett Publishers, 2008)			

EASC1401	Blue Planet (6 credits)	Academic Year	2017					
Offering Department	Earth Sciences	Quota						
Course Co-ordinator	Dr P Bach, Earth Sciences (pabach@hku.hk)							
Teachers Involved	(Dr P Bach,Earth Sciences)							
Course Objectives	The aim is to provide those students who are taking a first course in Earth System Sciences with a fundamental knowledge of how our diverse and living planet Earth works with weaving together an understanding of the dynamic and interactive processes in the Earth's lithosphere, hydrosphere, biosphere and atmosphere. In addition, students should become familiar with the way the study of Earth Sciences blends observation, information, hypothesis, communication and decision making for a better understanding of the future of our planet.							
Course Contents & Topics	<ul> <li>Hydrosphere (Surface- and Groundwater, Oceans and Water Cycle)</li> <li>Atmosphere (Composition, Weather, Climate, Green House Effect, Oxyle- Biosphere (Life, Ecosystems, Evolution and Extinction, Geochemical Cycle)</li> </ul>	The course will introduce and discuss the following topics: - Introduction to Earth Systems and Habitable Planet Earth, - Lithosphere (Earth Materials, Plate Tectonics, Volcanism, Earthquakes, Surface Processes and Rock Cycle) - Hydrosphere (Surface- and Groundwater, Oceans and Water Cycle) - Atmosphere (Composition, Weather, Climate, Green House Effect, Oxygen Cycle) - Biosphere (Life, Ecosystems, Evolution and Extinction, Geochemical Cycles, - Concepts and Evolution of Dynamic Earth Systems, Human Interactions with Planet Earth (Earth Resources,						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand the terminology and nomenclature appropriate to the introductory study of Earth Sciences  CLO 2 demonstrate knowledge and understanding of the underlying concepts associated with the study of the  Earth Systems and their dynamic interactive processes  CLO 3 understand the extent and nature of global change and environmental concerns around us							

	CLO 4 demonstrate the ability to make and record observations on Earth Systems processes in natural field environments							
	CLO 5 develop skills to synthesize observation and knowledge in a report in essay form							
Pre-requisites and Co-requisites and Impermissible combinations)	NIL							
Offer in 2017 - 2018			offer in 2018 - 2019 : Y	Examination				
Grade Descriptors (A+ to F)	A	attaining most or all of strong abilities to appl highly effective observ	mastery of extensive knowledge / compe the course learning outcomes. Shows cle ly and relate them in a range of complex ational skills in field as well as organizatior d insightful conclusions with an impressive	ear understanding of introductory terming interactive processes between Earth and skills to present important observations.	nology and concepts and Systems. Demonstrates			
	В	attaining most of the co some abilities to apply effective observational	ial command of knowledge / competenc ourse learning outcomes. Shows evidence y and relate them in a range of complex skills in field as well as organizational sh nsightful conclusions with some level of de	for understanding of introductory termit interactive processes between Earth kills to present important observations	inology and concepts an Systems. Demonstrates			
	С	required for attaining n and concepts and som moderately effective o	but incomplete command of knowledge nost of the course learning outcomes. Shor he abilities to apply and relate them in som beservational skills in field as well as organ se and results to draw appropriate conclus	ws evidence for some understanding o ne interactive processes between Earth nizational skills to present observations	f introductory terminolog n Systems. Demonstrate			
	D Demonstrate partial but limited command of knowledge / competencies/skills at an Earth Science introductory level required for attaining some of the course learning outcomes. Shows evidence of limited understanding of introductory terminology and concepts and limited abilities to apply and relate them in some interactive processes between Earth Systems. Demonstrates limited observational skills in field. Applies limited or barely effective organizational and presentational skills to present observed details and facts correctly. Limited ability to draw appropriate conclusions.							
	Fail	for attaining the course concepts and little or robservational skills in	o evidence of command of knowledge / cor se learning outcomes. Shows little or no o abilities to apply and relate them in inte field. Applies incoherent organizational and nable to draw appropriate conclusions.	o evidence of understanding of introceractive processes between Earth Syst	ductory terminology and tems. Demonstrates poo			
Course Type	Lecture v	with laboratory compo	onent course					
Course Teaching	Activitie	es	Details		No. of Hours			
Learning Activities	Lectures	3			24			
	Laborate	ory						
	Field wo	ork	Compulsory 2-day field cam	Compulsory 2-day field camp				
	Reading	/ Self study			100			
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examina	ation		40	CLO 1,2,3			
	Laborate	ory reports		20	CLO 1,2,4			
	Project r	report	Field project report	30	CLO 1,2,3,4,5			
	Test	•	Quizzes	10	CLO 1,2,3			
Required/recommended reading and online materials			The Blue Planet (2011) arth Science Today (1999)					

EASC1402	Principl	les of geo	logy (6 credi	its)		Academic Year	2017
Offering Department	Earth Scient	iences		•		Quota	
Course Co-ordinator	Prof M Su	un, Earth Sc	iences (minsun	@hku.hk)			
Teachers Involved		King,Earth So Sun,Earth Sc					
Course Objectives	- '			damental princip	es and concepts in geo	loav.	
Course Contents & Topics	- Earth's f - Rocks a - Plate tec - Earthqu - Igneous - Geomor - Sedimer - Folds, F - Metamo - Principle - Biostrati	formation, hi and rock cyclectonics: a uruakes and Eas processes a centary rocks Faults and Morphic rocks les of stratigr	story and geolo e iifying theory arth's interior and igneous roo d surficial proce etamorphism aphy; stratigrap hods; fossils ar	ogical time scale	·		
Course Learning Outcomes	CLO 1 CLO 2 CLO 3 CLO 4	recite the ro describe the explain the describe the	ck cycle and the overall structumajor geological	ure of the earth a al phenomena in eological dating	ould be able to: n the earth's crust nd the key external and the context of plate tec		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL		•	,			
Offer in 2017 - 2018	Y 1st	t sem Offe	r in 2018 - 2019	9 : Y		Examination	Dec
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						

	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply k familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcom Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to at knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	of analytical and critical at		skills required for attaining the course. Show very little or no ability to apective or ineffective.			
Course Type	Lecture w	ith laboratory componen	t course				
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures		12 sessions x 2 hours		24		
	Laboratory		laboratory practical on rocks and minerals, earthquakes, fossil identification		16		
	Field work		1 field trip		8		
	Group work		1 group project with presentation		4		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinat	ion	2-hour written exam	50	CLO 1,2,3,4,5		
	Laboratory reports		Practical/field reports	35	CLO 1,2,3,4,5		
	Project report		Presentation and report	15	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Tarbuck E	E.J. and Lutgens F.K.: Th	ne Earth: An Introduction to Ph	ysical Geology (latest edition)			

EASC1403	Geolog	gical heritage of H	long Kong (6 credits)	Academic Ye	ar 2017	
Offering Department	Earth Sc		, , , , , , , , , , , , , , , , , , ,	Quota	35	
Course Co-ordinator	Prof M F	Zhou, Earth Science	es (mfzhou@hku.hk)	'		
Teachers Involved		F Zhou, Earth Science	. • /			
Course Objectives			geology of Hong Kong, potential geol f Hong Kong's infrastructure.	ogical resources for touri	sm and the role o	
Course Contents & Topics	6 Lectur	res on general geolog ge pertaining to large	or nong Kong's Illinastructure. gy of Hong Kong, geology of Hong Kor e scale construction project plus at leas to localities of geological interest.			
Course Learning			this course, students should be able to:			
Outcomes			on of the processes leading to the forma	ation of various landforms		
			anding of the major morphological featur			
			tion and analytical skills, and physical at		n the field excursion	
			ferent impacts on / importance of geolog			
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2017 - 2018	Y 2r		18 - 2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking. Evidence of original thoughts, excellent field observation and ability to solve problems. Highly effective organization and presentation skills.					
	В					
	С	Demonstrate general but incomplete understanding required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Moderately effective organization and presentation skills.				
	D Fail	Demonstrate partial be coherent and logical to or barely effective organians. No or little knowledge	out limited understanding for attaining some of thinking, but with limited analytical and critical abili anizational and presentational skills.  Eabout the subject. No evidence for attaining the soherent thinking. Very little or no ability for field	he course learning outcomes. Stitles. Show limited ability to solve course learning outcomes. Lack	show evidence of some problems. Apply limited of analytical and critica	
Course Type	Lecture-	based course				
Course Teaching	Activitie	es	Details	No. of Hours		
& Learning Activities	Lectures	S	6 sessions x 2 hours		12	
	Field work		4 field trips (3 compulsory guid decided trip)	32		
	Group w	vork	1 presentation and report	17		
	Reading	g / Self study			60	
	Assessment		1 essay		20	
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents	attendance of 3 compulsory guided field trips	15	CLO 1,2,3,4	
	Essay		1 individual essay	15	CLO 1,2,3,4	
	Examina	ation	2-hour written examination	50	CLO 1,2,4	
	Presentation		1 group presentation	10	CLO 1,2,3,4	
	Project report				000 1,2,0,4	

EASC1404	Early life on earth (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	50
Course Co-ordinator	TBC, Earth Sciences ()		
Teachers Involved			

Course Objectives		This course focuses on the origins of life. It provides an overview of Earth's early environments, how life is thought to have originated on Earth, and how the Earth's dynamic environment impacted the origin of life. This course will					
	also provid	lso provide a basic overview of habitable environments on Earth and elsewhere in the Solar system.					
Course Contents	This cours	se will cover the follo	owing topics: the composition and p	roperties of the early Ea	arth and Earth's first		
& Topics	oceans; th	ne central role of water	r in life; abundance of biological elen	nents on the early Earth	and elsewhere in the		
	Solar syst	em; possible condition	ns for the synthesis of life's first building	ng blocks; the (geo)chem	nical roots of early life		
	on Earth a	and the search for life's	s signatures in the solar system and b	eyond.			
Course Learning	On succes	ssful completion of this	s course, students should be able to:	•			
Outcomes	CLO 1 d€	escribe the basic physic	ical and chemical conditions on the ea	arly Earth			
	CLO 2 ex		e role of water and extreme geocher	•	nthesis of biological		
			different geological environments pla	ved during the origins of	life		
			ciated with each step in the origins of				
		vestigate a current orig	·	iiiC			
Due ve suicitee	NIL	vestigate a current on	giris of file topic				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N		Examination	ı		
Grade Descriptors (A+ to F)	A	learning outcomes. Shows strong analytical and critical abilities and logical thinking, with evidence of original thought, and the ability to apply his/her knowledge to a wide range of problems that center around "origins of life" topics, and at the same, can combine knowledge from the natural sciences to better understand potential early Life processes on Earth and elsewhere.					
	Student shows the ability to apply highly effective organizational and presentational skills.  B Student demonstrates substantial command of a broad range of knowledge and skills required for attaining at least most of the						
	course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and apply his/her knowledge to a range of problems in the field of the "origins of life", and at the same, is capable to combine knowledge from the natural sciences to better understand potential early Life processes on Earth and elsewhere. Student shows the ability to apply effective organizational and presentational skills.						
	C Student demonstrates general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply his/her knowledge to a range of problems in the field of the "origins of life". Student shows the ability to apply moderately effective organizational and presentational skills.						
	D Student demonstrates partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability understand key topics in the "origins of life" field. Student shows the ability to apply limited or barely effective organizational and presentational skills.						
	Fail  Student demonstrates little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Shows very little or no ability to apply knowledge to understand basic topics related to the origins of life. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture wi	ith laboratory compone	ent course				
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures						
	Laborator	ſ <b>y</b>			24		
		/ Self study			100		
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	1 midterm, group presentations, short-essay	60	3		
	Examinat	ion	2-hour written examination	40			
Required/recommended	Sections f	rom: Mason, S.F.: Cho	emical Evolution (Oxford University Pr	ress, 1991)			
reading and	K.W. Plax	.W. Plaxco & M. Gross: Astrobiology: A brief Introduction (J. Hopkins University Press, 2006) Gilmour & M.A. Sephton: An Introduction to Astrobiology (Cambridge University Press, 2004)					

EASC1405	Pea	ceful use of nuclear technologies (6 credits)	Academic Year	2017			
Offering Department	Eartl	h Sciences ,	Quota				
Course Co-ordinator	Dr S	H Li, Earth Sciences (shli@hku.hk)					
Teachers Involved							
Course Objectives		provide students with the science backgrounds and knowledge o and to invoke an awareness of current applications of nuclear scie		hnologies in daily			
Course Contents & Topics	engii	Man and radiation; principles of nuclear technology; case studies of nuclear techniques applied in arts, engineering, biological, physical and social sciences; radiation on earth and beyond; industrial application of nuclear techniques; nuclear techniques in medical study. Future development in nuclear technologies.					
Course Learning	On s	successful completion of this course, students should be able to:					
Outcomes	CLC	) 1 recognize the science fundamentals in nuclear technologies					
	CLO 2 explain and describe the principles of nuclear technologies applied						
	CLO 3 have the awareness of current applications of nuclear sciences						
	CLO 4 demonstrate the knowledge and understanding of the underlying concepts associated with nuclear technologies						
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2017 - 2018	N	Offer in 2018 - 2019 : Y	Examination				
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive kno learning outcomes. Show strong analytical and critical abilities and logic to apply knowledge to a wide range of complex, familiar and unfamili- presentational skills.	cal thinking, with evidence of origin	al thought, and ability			
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cour learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to famil and some unfamiliar situations. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						

	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course I Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show lim knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail	of analytical and critical	le or no evidence of command of knowledge and skills required for attaining the course learning outcomes. d critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to some an adversariation and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-bas	sed course							
Course Teaching	Activities		Details		No. of Hours				
& Learning Activities	Lectures				36				
	Tutorials				12				
	Field work				6				
	Group work				6				
	Project work				6				
	Reading / Self study				92				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignments		Group activities and reports	30	CLO 1,2,3				
	Examination	on	2-hour	50	CLO 1,2,4				
	Project reports		Individual Report	20	CLO 1,3,4				
Required/recommended reading and online materials	To be anno	ounced		·					

EASC1406	Introdu	ction to the ear	rth-life system (6 credits)	Academic Ye	ear 2017		
Offering Department	Earth Sci	ences		Quota			
Course Co-ordinator	Dr Y L Li,	Or Y L Li, Earth Sciences (yiliang@hku.hk)					
Teachers Involved	(Dr Y L Li	i,Earth Sciences)					
Course Objectives	biological deep geo	interpretations or	ents with an introduction to the biosp n the co-evolution of the biosphere, current Earth-Life interactions with th	atmosphere, hydrosphere and	d geosphere through		
Course Contents & Topics	emergeno system	ce and persistenc	arbon cycle; plate tectonics, climat e of life; life in the Phanerozoic; the	Earth at extremes; the future			
Course Learning Outcomes	CLO 1 u		of this course, students should be able evolution of the inanimate world and		ugh deep geological		
	CLO 2 e	xplain why the Ear	rth is a habitable planet				
			ogical process as an agent of the mo				
			edge and understanding of the natura				
	CLO 5 a	nalyse qualitativel	y questions related to systematic stru	cture and evolution of the Eart	h-life system		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ASC1401					
Offer in 2017 - 2018	Y 2n	d sem Offer in 2	018 - 2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough and complete grasp of the subject in order to fulfil most or all learning outcomes. Show clear understanding of the connections between the geosphere, hydrosphere and biosphere of the modern Earth and in the geological past. Able to understand the interactions between human beings and the nature only happens as the latest processes on Earth.						
	B Demonstrate understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show understanding of the connections between the geosphere, hydrosphere and biosphere of the modern Earth and in the geological past. Can demonstrate the interactions between human being and the nature only happen in the latest geological time.						
	C Demonstrate general but incomplete understanding required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Moderately effective organization and presentation skills.						
	Demonstrate partial but limited understanding for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail  Get no or little knowledge about the subject. No evidence for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Very little or no ability for solving problems. Poor organization and presentational skills.						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures				36 12		
	Tutorials						
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents		50	CLO 1,2,3,4,5		
	Examina	tion		50	CLO 1,2,3,4,5		
Required/recommended reading and online materials	C. Cocke Press, 20		Edwards and N. Harris: An Introducti	on to the Earth-Life System (0	Cambridge University		

EASC2401	Fluid/solid interactions in earth processes (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Dr K H Lemke, Earth Sciences (kono@hku.hk)		
Teachers Involved	(Dr K H Lemke,Earth Sciences) (Prof Patrick PC Wu,Earth Sciences)		

Course Objectives	This course provides an overview of the physical and chemical principles that govern Earth processes						
Course Contents		s with approximate numb					
& Topics	- Earth in	the laboratory, scaling til	me and space (1)				
		,	and the concept of equilibrium	· ,			
			s - sublimation, condensation,	crystallisation and melting (2)			
		solution interfaces (1)					
			onments: convection, conducti				
			pe fractionation on geological	time scales(1)			
		an mechanics and basic	` ,				
		w and particle transport (	· ,				
		ional, geostrophic and ce					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes			es of thermodynamics as appli				
			plain processes of fluid/solid i				
			changed throughout the Earth				
			nding of the kinetics of geoche				
			s of motion and the basic forc	es affecting movement of gase	es, liquids and solids		
	-	n Earth					
Pre-requisites	Pass in E	ASC1401 or EASC1402					
(and Co-requisites							
and Impermissible							
combinations)			2010 11				
Offer in 2017 - 2018		d sem Offer in 2018 - 2		Examination			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and						
	presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course						
	В	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning					
		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D				ourse learning outcomes.		
		Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	of analytical and critical at		I skills required for attaining the course g. Show very little or no ability to a fective or ineffective.			
Course Type	Lecture w	vith laboratory componen	it course				
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Lectures		12 sessions x 2 hour		24		
•	Laborato		paper exercises		24		
		/ Self study	paper exercises		100		
Assessment Methods	Methods	•	Details	Weighting in final	Assessment		
and Weighting	Wethous	•	Details	course grade (%)	Methods to CLO Mapping		
	Assignm	ents		60	CLO 1,2,3,4,5		
	Examina			40	CLO 1,2,3,4,5		
Required/recommended reading and online materials		• •	(2007) - Brantley, Kubicki &		, ,=,0,1,0		

EASC2402	Field a	and laborator	y methods (6	credits)			Academic Year	2017
Offering Department	Earth S	Sciences					Quota	40
Course Co-ordinator	Dr P Ba	ach, Earth Scien	ces (pabach@hi	ku.hk)				
Teachers Involved	,	Bach,Earth Scien ' Q Zong,Earth S	,					
Course Objectives	This course is hands-on field and laboratory-based that introduces basic geological and geomorphological field and mapping techniques and the use of geological equipment and air photographs, an overview of the geology and natural environment of Hong Kong.							
Course Contents & Topics	- Interp structur unconfo - Interp - Field	- Maps and map reading, map reference system (lectures and class practice) - Interpretation of geological and topographic maps: topographic and geological cross sections, geological structures from outcrop patterns and structural contour lines (horizontal, inclined strata, folded, and faulted strata unconformities (lectures and class practice) - Interpretation and use of air photographs (class practice) - Field observation and description of rocks, outcrops (with fieldtrips in Hong Kong) - Field observation and description of landscape units (with fieldtrips in Hong Kong) - Laboratory equipment and technicues (lectures and lab sessions)						
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 read geological maps and comprehend 3-D geological structures from 2-D geological maps							
	CLO 2 construct a geological cross section showing interpreted subsurface rocks and structures, and natural landscape units							
	CLO 3 demonstrate techniques for basic field observations, measurements and identifications							
	CLO 4 create and interpret an internally consistent geological and landscape maps from a set of collected field observations and data							
	CLO 5 develop skills in integrating geological field data in determining a geological and landscape history and writing a structured field report							
	CLO 6 understand to the basics of a series of laboratory techniques for geological and environmental studies							
Pre-requisites (and Co-requisites and Impermissible	Pass in	EASC1401 or E	ASC1402					

combinations)							
Offer in 2017 - 2018	Y 1st	sem Offer in 2018	- 2019 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough and complete grasp of the subject in order to fulfill most or all learning outcomes. Shows strong ability to record observations on earth processes in the field and to apply knowledge to familiar and unfamiliar situations. Evidence of strong independent analytical, critical and logical thinking. Show strong ability to synthesize all observations made and knowledge in a field report and geological map with highly effective organizational and presentational skills.					
	В	Demonstrate substantial grasp of the subject required for most of the learning outcome. Shows evidence of ability to record observations on earth processes in the field and to apply knowledge to familiar and some unfamiliar situations. Evidence of independent analytical, critical and logical thinking. Shows ability to synthesize all observations made and knowledge in a field report and geological map with effective organizational and presentational skills.					
	С	record observations on independent analytical,	earth processes in the field and a	uired for most of the learning outcome. Evapply knowledge to most familiar situativity to synthesize most observations made onal and presentational skills.	ons. Evidence of some		
	D						
	Fail  Demonstrate little or no grasp of the subject required for most of the learning outcome. Little or no evidence of ability to record observations on earth processes in the field and show very little or no ability to apply knowledge to solve problems. Evidence of little or lack of analytical and critical abilities, coherent and logical thinking. Shows very little or no ability to synthesize observations made and knowledge in a field report and geological map with incoherent organizational and poor presentational skills.						
Course Type	Field cam	ps					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures		12 sessions x 1 hour	12 sessions x 1 hour			
	Field wor	k	5-day field camp & 2 day trips		56		
	Laborator	ry work	12 hours paper exercises	12			
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Lab Assignments	10	CLO 1,2		
	Report		Field Work Assessment	70	CLO 2,3,4,5		
	Test			20	CLO 1,2		
Required/recommended reading and online materials		ensive Course Notes nes: Basic Geological	provided. Mapping (Wiley, 1995, 3rd edi	ition)			

EASC2404	introdu	ction to atmosphe	re and hydrosphere (6 credits)	Academic Ye	<b>ar</b> 2017		
Offering Department	Earth Sci	iences	· · · · · · · · · · · · · · · · · · ·	Quota	50		
Course Co-ordinator	Dr J R Ali, Earth Sciences (jrali@hku.hk)						
Teachers Involved		(Dr J R Ali,Earth Sciences) (Prof P P C Wu,Earth Sciences)					
Course Objectives	This cou		osphere and hydrosphere systems, and e	xplains at a basic lev	el how they interac		
Course Contents & Topics	Introduction and course plan, Earth within a broader context (Solar System and other key features); Geological forces shaping the floor of the Oceans and Seas; Water Structure, Ocean Structure and Seawater Composition/Chemistry; Introduction to the Atmosphere; Heating Earth's surface and Atmosphere; Temperature; Moisture and Atmospheric Stability; Forms of condensation and precipitation; Hydrological Cycle - an overview; Air Pressure and Winds; Intro to Atmospheric Circulation and Weather Systems; Ocean Circulation; Waves; Tides; Coasts; Groundwater basics; Groundwater usage, contamination, caves and karst; Glaciers and glacial landscapes; Climate system, proxy data, causes of climate change; Effects of climate change.						
Course Learning Outcomes	CLO 1 up CLO 2 a lc CLO 3 u F CLO 4 u tt	On successful completion of this course, students should be able to:  CLO 1 understand the important features which distinguish Earth from the other planets within our Solar System, particularly with regards to its outer fluid envelopes  CLO 2 appreciate that on a geological timescale, the ocean basins and the seas are continually changing their location and morphology, and why this is the case  CLO 3 understand the key features of water, and the critical role the compound plays in the Atmosphere Hydrosphere system  CLO 4 understand the basic physical phenomena associated with the Atmosphere and the Oceans/Seas and their important lower-order elements					
Pre-requisites and Co-requisites and Impermissible	CLO 5 have an awareness of the scientifically "hot" Atmosphere and Hydrosphere topics  Pass in EASC1401 or EASC1402						
combinations)							
•	Y 1s	st sem Offer in 2018 -	2019 : Y	Examination	Dec		
combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Y 1s  A  B	Thorough grasp of the presentational skills; insi and to quote/reference a Substantial grasp of the skills; critical use of rel	subject; evidence of strong critical abilities and lo ghtful use and critical analysis / evaluation of informa- ptly; integration of the full range of appropriate theori- subject; evidence of critical abilities and logical the evant information from sources, showing ability to	gical thinking; highly effection drawn from a full ranges, principles, evidence and inking; effective organizati make meaningful compar	ctive organizational and e of high quality sources d techniques. onal and presentational isons between different		
Offer in 2017 - 2018 Grade Descriptors	A	Thorough grasp of the presentational skills; isiand to quote/reference a Substantial grasp of the skills; critical use of rel secondary interpretation.  General but incomplete organizational and prese	subject; evidence of strong critical abilities and lo ghtful use and critical analysis / evaluation of informa ptly; integration of the full range of appropriate theori- subject; evidence of critical abilities and logical th	gical thinking; highly effection drawn from a full rang se, principles, evidence and inking; effective organizati make meaningful compar theories, principles, eviden bilities and logical thinkin ces, showing ability to mal	ctive organizational and e of high quality sources it techniques. onal and presentational isons between different ce and techniques. g; moderately effective te comparisons betweet		
Offer in 2017 - 2018 Grade Descriptors	В	Thorough grasp of the presentational skills; insi and to quote/reference a Substantial grasp of the skills; critical use of rel secondary interpretation: General but incomplete organizational and prese different interpretations a Limited grasp of the sub barely effective organizar tather than analysis and	subject; evidence of strong critical abilities and loghtful use and critical analysis / evaluation of informatily; integration of the full range of appropriate theorisubject; evidence of critical abilities and logical the evant information from sources, showing ability to a and to quote/reference aptly; general integration of grasp of the subject; evidence of some critical antational skills; use of relevant information from sound to quote/reference aptly; some partial integration etc., retention of some relevant information of the sutional and presentational skills; use and reference comparison; limited integration of theories, principles	gical thinking; highly effection drawn from a full rang se, principles, evidence and inking; effective organizati make meaningful compar theories, principles, eviden bilities and logical thinkin ces, showing ability to mal of theories, principles, evid bject; evidence of limited of several sources, but n evidence and techniques.	ctive organizational and e of high quality sources it techniques. onal and presentational isons between different ce and techniques. g; moderately effective the comparisons between ence and techniques. critical abilities; limited on anily through summary		
Offer in 2017 - 2018 Grade Descriptors	A B C	Thorough grasp of the presentational skills; insi and to quote/reference a Substantial grasp of the skills; critical use of rel secondary interpretation: General but incomplete organizational and prese different interpretations a Limited grasp of the subbarely effective organizarather than analysis and Little or no grasp of the k thinking; incoherent organizarional results of the k thinking; incoherent organizarional skills in the second s	subject; evidence of strong critical abilities and loghtful use and critical analysis / evaluation of informatly; integration of the full range of appropriate theorisubject; evidence of critical abilities and logical the evant information from sources, showing ability to and to quote/reference aptly; general integration of grasp of the subject; evidence of some critical antational skills; use of relevant information from sound to quote/reference aptly; some partial integration iect, retention of some relevant information of the subject into and presentational skills; use and reference	gical thinking; highly effection drawn from a full rang so, principles, evidence and so, principles, evidence and feetive organization make meaningful compartheories, principles, evidences, showing ability to mal of theories, principles, evidence of limited coff several sources, but no evidence and techniques, evidence and techniques, to evidence and techniques to evidence of critical ability of secondary sources and to	ctive organizational and e of high quality sources to techniques. onal and presentational isons between different ce and techniques. g; moderately effective the comparisons between ence and techniques. critical abilities; limited on aninly through summary es and logical / coheren		
Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type	A B C D	Thorough grasp of the presentational skills; insi and to quote/reference a Substantial grasp of the skills; critical use of rel secondary interpretation: General but incomplete organizational and prese different interpretations a Limited grasp of the subbarely effective organizarather than analysis and Little or no grasp of the k thinking; incoherent organizarional results of the k thinking; incoherent organizarional skills in the second s	subject; evidence of strong critical abilities and loghtful use and critical analysis / evaluation of informatly; integration of the full range of appropriate theorisubject; evidence of critical abilities and logical the evant information from sources, showing ability to a and to quote/reference aptly; general integration of grasp of the subject; evidence of some critical antational skills; use of relevant information from sound to quote/reference aptly; some partial integration etc., retention of some relevant information of the subject integration of some relevant information of the subject integration of theories, principles nowledge and understanding of the subject; little or nization and poor presentational skills; limited use of integration of theories, principles, evidence and techniques.	gical thinking; highly effection drawn from a full rang so, principles, evidence and so, principles, evidence and feetive organization make meaningful compartheories, principles, evidences, showing ability to mal of theories, principles, evidence of limited coff several sources, but no evidence and techniques, evidence and techniques, to evidence and techniques to evidence of critical ability of secondary sources and to	ctive organizational and e of high quality sources to techniques. onal and presentational isons between different ce and techniques. g; moderately effective the comparisons between ence and techniques. critical abilities; limited on aninly through summary es and logical / coheren		
Offer in 2017 - 2018 Grade Descriptors	A B C D	Thorough grasp of the presentational skills; insi and to quote/reference a Substantial grasp of the skills; critical use of rel secondary interpretation: General but incomplete organizational and prese different interpretations a Limited grasp of the sub barely effective organizarather than analysis and Little or no grasp of the thinking; incoherent orgathem; little or no or inapt with laboratory compor	subject; evidence of strong critical abilities and loghtful use and critical analysis / evaluation of informatly; integration of the full range of appropriate theorisubject; evidence of critical abilities and logical the evant information from sources, showing ability to a and to quote/reference aptly; general integration of grasp of the subject; evidence of some critical antational skills; use of relevant information from sound to quote/reference aptly; some partial integration etc., retention of some relevant information of the subject integration of some relevant information of the subject integration of theories, principles nowledge and understanding of the subject; little or nization and poor presentational skills; limited use of integration of theories, principles, evidence and techniques.	gical thinking; highly effection drawn from a full rang so, principles, evidence and so, principles, evidence and feetive organization make meaningful compartheories, principles, evidences, showing ability to mal of theories, principles, evidence of limited coff several sources, but no evidence and techniques, evidence and techniques, to evidence and techniques to evidence of critical ability of secondary sources and to	ctive organizational and e of high quality sources t techniques. onal and presentational isons between different ce and techniques. g; moderately effective the comparisons between ence and techniques. critical abilities; limited on aninly through summary es and logical / coheren		

	Laboratory	including tutorials & discu	24	
	Project work			10
	Reading / Self study			90
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		20	CLO 4,5
	Essay		25	CLO 1,2,3,4,5
	Examination		50	CLO 1,2,3,4,5
	Presentation		5	CLO 1,2,3,4,5
Required/recommended reading and online materials			ience ere: An Introduction to Meteorology	,

EASC2406	Geoche	mistry (6 credits)		Academic Yea	r 2017			
Offering Department	Earth Scient			Quota				
Course Co-ordinator	Dr D Chu	ng, Earth Sciences (dian	nec@hku.hk)					
Teachers Involved	(Prof GC	ung,Earth Sciences) Zhao,Earth Sciences) Zhou,Earth Sciences)						
Course Objectives	This course provides an understanding of the fundamentals and approaches for geochemical analysis. It introduces students to the basic chemical principles, modern techniques and quantitative analysis for studying the earth.							
Course Contents & Topics	<ul> <li>Physical and chemical state of the earth,</li> <li>Differentiation of and cosmic abundance of elements,</li> <li>Aqueous solutions and chemistry of natural water,</li> <li>Trace element,</li> <li>Chemistry of igneous rocks,</li> <li>Chemical controls on soil formation,</li> <li>Radioactive isotope geochemistry,</li> <li>Stable isotope geochemistry,</li> <li>Oxidation and reduction,</li> <li>Chemical weathering</li> </ul>							
Course Learning Outcomes	CLO 1 de st CLO 2 de CLO 3 ap	On successful completion of this course, students should be able to:  CLO 1 demonstrate an understanding of basic principles of geochemistry and their applications to geological studies  CLO 2 describe element distribution in major rocks  CLO 3 apply the principles of isotopes to dating and studies of petrogenesis and climate changes  CLO 4 demonstrate knowledge of the chemical weathering processes						
Pre-requisites and Co-requisites and Impermissible combinations)		ASC1402	C.					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	019 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A Demonstrate extensive knowledge and skills at an advanced level required for attaining all the course learning ou strong analytical and critical abilities and logical thinking, and ability to apply highly effective lab skills and techniques to solve problems. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply effective and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the coutcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply moder lab skills and techniques to solve problems. Mostly correct but some erroneous use of data and results to dra conclusions. Apply moderately effective organizational and presentational skills.  D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learn Show evidence of some coherent and logical thinking, but with limited analytical and critical ability to use data and results to dra conclusions. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning of the course le							
O	of analytical and critical abilities, logical and coherent thinking, and ability to apply minimally effective or ineffective lab skills and techniques to solve problems. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.							
Course Type		ith laboratory componen	Table 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		No of H			
Course Teaching	Activitie	S	Details		No. of Hours			
Learning Activities	Lectures	<b>P.</b> .	12 sessions x 2 hours		24			
	Laborato	y	paper exercises		24			
	Tutorials Reading / Self study				6			
Accomment Mathada	- 0	,	Detelle	NA/	100			
Assessment Methods and Weighting	Methods	ents	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin CLO 1,2,3,4			
	Examina			60	CLO 1,2,3,4			
Required/recommended reading and online materials	Krauskop	f K.B. and Bird D.K. Intro	s of Geochemistry (Prentice H oduction to Geochemistry (Mo nemistry (Jones and Bartlett P	Graw-Hill, Inc. 1995, 3rd ed.)				

EASC2407	Mineralogy (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	30
Course Co-ordinator	Prof M Sun, Earth Sciences (minsun@hku.hk)		

Teachers Involved	(Prof M F Zhou,Earth Sciences) (Prof M Sun,Earth Sciences)						
Course Objectives		To provide essential knowledge of mineralogy, to familiarize students with common minerals that are basis for study of petrography of igneous, sedimentary and metamorphic rocks.  - Mineral crystallization, mineral chemistry					
Course Contents	- Mineral	crystallization, mine	ral chemistry				
& Topics		symmetry, Miller inc					
	, ,	al properties of miner					
		•	re and classification				
		•	g minerals-hand specimens				
		petrographic microso properties under pla	•				
			hoscopic illumination				
			noscopic illumination				
			g minerals-thin sections				
		is minerals	,				
	- Chemic	al variations of mine	rals				
	- Trace e	elements					
		ent analysis for mine					
Course Learning			this course, students should be				
Outcomes			and systems used in classificat				
		appiy the physical ar structure	nd chemical properties used in	identification of rock-forming min	eralogy and minera		
			of optical mineralogy				
			rock-forming minerals in hand sp	perimens and thin sections			
			nciples of mineral chemistry	Decimens and thin sections			
Pre-requisites		EASC1402	Topics of Hillieral Grieffield y				
and Co-requisites	1 455 111 L	_A301402					
and Impermissible							
combinations)							
Offer in 2017 - 2018	Y 1s	t sem Offer in 201	8 - 2019 : Y	Examination	Dec		
Grade Descriptors	A Demonstrate extensive knowledge and skills at an advanced level required for attaining all the course learning outcomes. Show						
(A+ to F)	strong analytical and critical abilities and logical thinking, and ability to apply highly effective lab skills and techniques to solve problems. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course					
		learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply effective lab skills and techniques to solve problems. Correct use of data of results to draw appropriate conclusions. Apply effective organizational					
		and presentational skills.					
	С						
		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply moderately effective lab skills and techniques to solve problems. Mostly correct but some erroneous use of data and results to draw appropriate					
		conclusions. Apply moderately effective organizational and presentational skills.					
	D	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.					
		Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities, and limited ability to apply partially effective lab skills and techniques to solve problems. Limited ability to use data and results to draw appropriate					
	F-::		nited or barely effective organizational ar		. Incerning autonomon I a		
	Fail			and skills required for attaining the course a, and ability to apply minimally effective o			
	of analytical and critical abilities, logical and coherent thinking, and ability to apply minimally effective or ineffective lab skills and techniques to solve problems. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and						
Course Type	Locturo		re minimally effective or ineffective.				
Course Type Course Teaching	Activitie	with laboratory comp	Details		No. of Hours		
Learning Activities	Lectures		12 sessions x 2 hours		24		
g /	Laborato		12 sessions x 2 hours		24		
		/ Self study	12 303310113 X 2 110013		100		
Assessment Methods	Methods	•	Details	Weighting in final	Assessment		
and Weighting	wethous	3	Details	course grade (%)	Methods		
				Course grade (70)	to CLO Mappin		
	Assignm	nents		40	CLO 1,2,3,4,5		
	Examina			60	CLO 1,2,3,4,5		
•	C. Klein a	and C.S. Hurlbat: Ma	anual of Mineralogy (Wiley, 1999	9, 1st ed.)	,,=,0,1,0		
	W D Nes	sse: Introduction to (	Optical Mineralogy (Oxford Unive	ersity Press 1998 2nd ed)			
eading and online materials	11.5.110		Space minoralogy (Salora Shire	510ity 1 1000, 1000, End 0d).			

EASC2408	Planetary geology (6 credits)	Academic Year	2017				
Offering Department	Earth Sciences Quota						
Course Co-ordinator	Dr M H Lee, Earth Sciences (mhlee@hku.hk)						
Teachers Involved	(Dr J Michalski,Earth Sciences) (Dr M H Lee,Earth Sciences)						
Course Objectives	This course provides students with an introduction to the origin, evolution, struct matter in the Solar System condensed in the form of planets, satellites, comets, emphasis on surface features, internal structures and histories from a geo incorporates the findings from recent space investigations, planetary imagery, reto extraterrestrial features into a fascinating portrayal of the geological activities	asteroids and ring logical point of vi emote sensing and	gs, with particular lew. The course I Earth analogues				
Course Contents & Topics	Formation, evolution, internal structure and surface processes of planetary bodies; the terrestrial planets Mercury, Venus, the Earth-Moon system, and Mars; the giant planets Jupiter, Saturn, Uranus, and Neptune and their moons; Pluto, Charon and the Kuiper Belt; asteroids, meteorites, comets and the Oort cloud; Origin of our Solar System.						
Course Learning	On successful completion of this course, students should be able to:	, 0	•				
Outcomes	CLO 1 describe the basic features of our Solar System and its constituents						
	CLO 2 explain how this knowledge is acquired through observations and experiments						
	CLO 3 demonstrate knowledge and understanding of the key geological, physical and chemical processes governing the structure, formation and evolution of planetary bodies						
	CLO 4 compare and contrast our own planet Earth with other planetary bodies						

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EASC1401 or EASC1402 or PHYS1650								
Offer in 2017 - 2018	Y 2r	nd sem Offer in 2018 - 2	sem Offer in 2018 - 2019 : Y Examination						
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.							
	В	learning outcomes. Show e	ommand of a broad range of k evidence of analytical and critica ons. Apply effective organizatio	al abilities and logical thinking					
	С	outcomes. Show evidence	incomplete command of know of some analytical and critical oderately effective organization	I abilities and logical thinking					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail								
Course Type	Lecture	with laboratory componer	nt course	•					
Course Teaching	Activitie	es .	Details			No. of Hours			
& Learning Activities	Lectures	3	12 sessions x 2 hours			24			
	Laborat	ory	12 sessions x 2 hours			24			
	Reading	J / Self study				100			
Assessment Methods and Weighting	Method	s	Details		ing in final grade (%)	Assessment Methods to CLO Mapping			
	Assignn	nents			20	CLO 1,2,3,4			
	Examina	ation			50	CLO 1,2,3,4			
	Present	ation			15	CLO 1,2,3,4			
	Test				15	CLO 1,2,3,4			
Required/recommended reading and online materials	N. McBr	ide and I. Gilmour: An Int	roduction to the Solar Sy	stem (Cambridge Unive	ersity Press, 20	04)			

EASC2409	Region	nal field studies	(6 credits)	Academic Ye	ear 2017			
Offering Department		th Sciences Quota 40						
Course Co-ordinator	Dr J R A	Ali, Earth Sciences (	irali@hku.hk)	'				
Teachers Involved	(Dr J R Ali (Taiwan Field Trip),Earth Sciences)							
	(Prof M	(Prof M Sun (Wuhan Field Trip),Earth Sciences)						
Course Objectives	This cou	urse is field-based	and introduces geology of China	, Taiwan and/or regions in the vi	cinity of Hong Kon			
_	through	hands on studies ar	nd field excursions.	_				
	The cou	ne course is compulsory for majors in Geology (accredited pathway)						
Course Contents	The cou	rse will introduce th	e following topics:					
& Topics								
			ern China and/or Taiwan					
		gical history of S. Ch						
			and minerals in the field					
		•	ription of geological structures					
		raphic measuremen						
		eology of active and	passive margins					
	- Engine	eering geology gement of geological	hazarda					
		geological mapping						
Course Learning			f this course, students should be	able to:				
Outcomes			,		and South China			
Jutcomes	CLO 1 have acquired a broad understanding of the geology of east Asia, in particular, Taiwan and South China							
	CLO 2 be able to undertake basic field observations, stratigraphic measurements and identifications of rocks and minerals							
	CLO 3 have acquired at least 3 days of experience in independent stratigraphic logging and geological mapping							
	CLO 4 develop skills in integrating geological field data in determining a geological history and writing a structured field report							
Pre-requisites			C1402: and consent of course co	ordinator				
and Co-requisites	Pass in EASC1401 or EASC1402; and consent of course coordinator							
and Impermissible								
combinations)								
Offer in 2017 - 2018	Y 19	st sem Offer in 20	18 - 2019 : Y	Examination	No Exam			
Grade Descriptors	Α			eology of the study sites, ability to give a				
(A+ to F)	geological history of the study region, as well as strong ability to produce good-quality reports on independent field							
()	measurements.							
	B Demonstrate a satisfactory understanding of the geology of the study sites with evidence on efforts to unravel the geological history of the study region and acceptable level of competence in field measurement techniques.							
	С							
			pasic knowledge on field measurement te	•	•			
	D			y sites and limited ability to apply field mea				
	Fail Show no or little knowledge of the geology of the study sites and lack of ability in making field observations and applying fiel measurement techniques.							
Course Type	Field car		iques.					
Course Type	Activiti	•	Details		No. of Hours			
Learning Activities	Field wo				100			
Louining Activities			15 days		20			
		g / Self study	B. (. !!.	144.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1	-			
	Method	is	Details	Weighting in final				
	mounou				Assessment			
Assessment Methods and Weighting	ourou			course grade (%)	Methods to CLO Mappin			

	Report		100	CLO 1,2,3,4
Required/recommended reading and online materials	Comprehensive course notes provi	ided		
Additional Course Information	Due to planning issues, priority is January of each year, the Wuhan t			van trip will be in early

EASC2410	Data an	alysis and mod	eling in earth sciences (6 credits)	Academic Ye	<b>ar</b> 2017				
Offering Department	Earth Sci	ences		Quota					
Course Co-ordinator	TBC, Ear	th Sciences ()							
Teachers Involved									
Course Objectives	sciences	This course uses a hands-on approach to introduce the basic principles of data analysis and modeling in earth sciences through practical examples.							
Course Contents & Topics	linear an	Statistical description of data (sampling, errors, distributions and their moments, hypothesis testing); correlation, linear and nonlinear regression; time series analysis; spatial data visualization and analysis; basic numerical methods and numerical solutions of equations; use of computer software such as MATLAB and GIS.							
Course Learning	On succe	essful completion of	this course, students should be able to:						
Outcomes	CLO 1 E	xplain basic statisti	cal concepts and their applications to ear	th science data processing	g and modeling				
	CLO 2 D	emonstrate knowle	dge in basic numerical methods, their ap	olications in earth science	s, and limitations				
		opply appropriate moftware such as MA	ethods to analyze, process and visualize ATLAB and GIS	earth science data, with the	ne help of computer				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	EASC1401							
Offer in 2017 - 2018	N Of	fer in 2018 - 2019 :	Υ	Examination					
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.								
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.								
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.								
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.								
	Fail	of analytical and cri	no evidence of command of knowledge and skills r tical abilities, logical and coherent thinking. Show on and presentational skills are minimally effective of	very little or no ability to ap					
Course Type	Lecture w	vith laboratory comp	oonent course						
Course Teaching	Activitie	s	Details	Details					
& Learning Activities	Lectures				24				
	Laborato	ory							
	Reading	/ Self study			100				
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignm	ents	Assignments and project	50	CLO 1,2,3				
		Examination 50 CLO 1.2.3							
Required/recommended reading and online materials	M. H. Tra	uth: MATLAB Reci	pes for Earth Sciences (Springer, 2015)						

EASC3020	Global change: anthropogenic impacts (6 credits)  Academic Year   2017						
Offering Department	Earth Sci	ences	Quota				
Course Co-ordinator	Dr Z H Li	u, Earth Sciences (zhliu@hku.hk)					
Teachers Involved							
Course Objectives		This course will explore the role of humans in global change and the environmental responses to such changes. Causes and impacts of climate change will be discussed.					
Course Contents & Topics	evolution	varming, greenhouse gas emission, past climates, climatic and , natural vs. anthropogenic climate change, model projections tty, impacts of climate change, including sea level, fresh water, food	of future climate cl	hange, scientific			
Course Learning	On succe	essful completion of this course, students should be able to:					
Outcomes	CLO 1	recognise the complexity of global climate systems					
	CLO 2	recognise the controversy of anthropogenic global warming					
	CLO 3	identify modern environmental issues					
	CLO 4	CLO 4 assess the credibility of various scientific arguments					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ASC2404 or ENVS2001					
Offer in 2017 - 2018	N Of	fer in 2018 - 2019 : Y	Examination				
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilit to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate critical use of data and results the draw appropriate and insightful conclusions. Show insightful use and critical analysis / evaluation of information drawn from a further range of high quality sources and to quote/reference aptly.					
	В	Demonstrate substantial command of a broad range of knowledge and skills re learning outcomes. Show evidence of analytical and critical abilities and logical th and some unfamiliar situations. Demonstrate correct use of data and results to our content of the state	inking, and ability to apply	knowledge to familiar			

		of relevant information from and to quote/reference aptly	sources and ability to make meaningful c	omparisons between different s	secondary interpretations
	С	outcomes. Show evidence of familiar situations. Demonst	ncomplete command of knowledge and slof some analytical and critical abilities and trate mostly correct but some erroneous us mation from sources and ability to make	logical thinking, and ability to a se of data and results to draw	apply knowledge to most appropriate conclusions.
	D	Show evidence of some con knowledge to solve problem	ted command of knowledge and skills requierent and logical thinking, but with limited a s. Demonstrate limited ability to use data an s, but mainly through summary rather than a	nalytical and critical abilities. Sh d results to draw appropriate co	low limited ability to apply
	Fail	of analytical and critical at	lence of command of knowledge and skills r bilities, logical and coherent thinking. Show suse of data and results and/or unable t ritical comparison of them.	v very little or no ability to ap	oply knowledge to solve
Course Type	Lecture-	based course			
Course Teaching	Activiti	es	Details	No. of Hours	
& Learning Activities	Lecture	S			36
	Project	work			30
	Tutorial	S			12
	Discuss	ion			24
	Reading	g / Self study			48
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Essay		Coursework Assessment	25	CLO 1,2,4
	Examin	ation	One 2-hour written examination	50	CLO 1,2,4
	Project	report		25	CLO 2,3,4

EASC3402	Petrolog	gy (6 credits)		Academic Yea	r 2017		
Offering Department	Earth Sci	ences		Quota			
Course Co-ordinator	Prof G Zh	ao, Earth Sciences	(gzhao@hku.hk)				
Teachers Involved	(Prof G Z	man,Earth Science hao,Earth Sciences un,Earth Sciences)	) <sup>´</sup>				
Course Objectives				entary, igneous and metamorphic ro ctures in both hand specimens and u			
Course Contents & Topics  Course Learning Outcomes	volcanism - Basic ig - Intermed - Acid ign - Sedimer - Clastic s - Biochen - Metamo of metamo - Meta-pe - Meta-ba - Meta-ca On succe	<ul> <li>Magma and magmatism; textures and structures of igneous rocks, classification of igneous rocks, incluvolcanism and plutonism</li> <li>Basic igneous rocks</li> <li>Intermediate igneous rocks</li> <li>Acid igneous rocks</li> <li>Sedimentary diagenesis, classification of sedimentary rocks; textures and structures of sedimentary rocks.</li> <li>Clastic sedimentary rocks: conglomerate and sandstone, siltstone and mudstone</li> <li>Biochemical sedimentary rocks: limestone and dolostone</li> <li>Metamorphism; controlling factors of metamorphism; textures and structures of metamorphic rocks; classific of metamorphic rocks</li> <li>Meta-pelitic rocks</li> <li>Meta-basic rocks</li> <li>Meta-basic rocks and meta-felsic rocks</li> <li>On successful completion of this course, students should be able to:</li> <li>CLO 1 identify major igneous rocks and their textures and structures in both hand specimens and uncontrolled.</li> </ul>					
Dro vogujejtoo	microscope CLO 2 identify major sedimentary rocks and their textures and structures in both hand specimens and under microscope CLO 3 identify major metamorphic rocks and their textures and structures in both hand specimens and under microscope CLO 4 make full description and write report on the above rock types Pass in EASC2407						
Pre-requisites (and Co-requisites and Impermissible combinations)							
Offer in 2017 - 2018			18 - 2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A B C D	learning outcomes. S to apply knowledge to Demonstrate substan learning outcomes. Sl and some unfamiliar s Demonstrate general outcomes. Show evic familiar situations. Demonstrate partial b	In mastery at an advanced level of extensive knowledge and skills required for attaining all the chow strong analytical and critical abilities and logical thinking, with evidence of original thought, and a wide range of complex, familiar and unfamiliar situations.  It is a proper of complex to the proper of knowledge and skills required for attaining at least most of the now evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to situations.  In the proper of knowledge and skills required for attaining most of the course let lence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to such thinking and ability to apply knowledge and skills required for attaining some of the course learning out the coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to oblems.				
		of analytical and critic	al abilities, logical and coherent thinking	Show very little or no ability to apply knowle			
Course Type	-1-	rith laboratory comp					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures	rv	12 sessions x 2 hours specimen descriptions &	thin-section observations under	24 24		
		•	microscope				
		/ Self study			100		
Assessment Methods and Weighting	Methods	i	Details	Weighting in final course grade (%)	Assessment Methods		

				to CLO Mapping
	Assignments		40	CLO 1,2,3,4
	Examination		60	CLO 1,2,3,4
Required/recommended reading and online materials	Harvey Blatt and Robert J. Tracy, F	Petrology (Second Edition; W.H. Fre	eman and Company, New	v York)

EASC3403	Sedimer	ntary environments	(6 credits)	Academic Yea	ır 2017		
Offering Department	Earth Scie	nces		Quota			
Course Co-ordinator	Dr J King,	Earth Sciences (jesskir	ng@hku.hk)				
Teachers Involved		,Earth Sciences) cKenzie,Earth Sciences	S)				
Course Objectives	This course discusses the origin, diagenesis, classification and economic importance of sedimentary rocks. Students will learn features and processes of sedimentary geology, paleontology and depositional processes.						
Course Contents & Topics	- Overview of sedimentary geology - Physics of erosion, transportation and sedimentation - Sedimentary structures - Depositional environments (non-marine) - Depositional environments (marine) - Sequence stratigraphy - Basin analysis - Sedimentary environment around Hong Kong						
Course Learning		tary environment on Ma	course, students should be abl	e to:			
Outcomes	CLO 1		d significance of sedimentary f				
- L. Comos	CLO 1		siliciclastic rocks in hand sam				
	CLO 2	,	depositional environment	ЛС			
	CLO 4		dy of a stratigraphic section in	the field			
	CLO 4		tions and interpretations from (				
Pre-requisites		ASC2402 or EASC3402	•	butcrops			
(and Co-requisites and Impermissible combinations)		1002402 01 EA000402					
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject. Show strong analytical abilities and logical thinking, with evidence of original thought. Apply highly effective lab/fieldwork skills and techniques. Apply highly effective organizational and presentational skills.  B Demonstrate substantial grasp of the subject. Show strong analytical abilities and logical thinking. Apply effective lab/fieldwork						
	С	skills and techniques. Apply highly effective organizational and presentational skills.  Demonstrate general but incomplete grasp of the subject. Show some analytical abilities and logical thinking. Apply moderately effective lab/fieldwork skills and techniques. Apply moderately effective organizational and presentational skills.					
	Demonstrate partial but limited grasp of the subject. Show some analytical abilities and logical thinking. Apply partially effective lab/fieldwork skills and techniques. Apply limited or barely effective organizational and presentational skills.						
	Pail Demonstrate little or no grasp of the subject. Evidence of little or lack of analytical abilities and logical thinking. Apply minimal effective lab/fieldwork skills and techniques. Organization and presentational skills are ineffective.						
Course Type		th laboratory componer					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures		12 sessions x 2 hours		24		
	Laborator	,	6 sessionsx 2 hours		12		
	Field worl		1 day trip with field project		8		
	Project wo		Examples for sedimentary er	nvironments	12		
		Self study			90		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinat	ion		40	CLO 1,2,3,4		
	Laborator	y reports		20	CLO 1,2,3,4,5		
	Presentat	ion		10	CLO 3		
	Test		Mid-term examination	30	CLO 1,2,3		
Required/recommended reading and online materials	Sedimento	ology and Stratigraphy (	Second Edition), Gary Nichols				

EASC3404	Structural geology (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	40
Course Co-ordinator	Dr J R Ali, Earth Sciences (jrali@hku.hk)	'	
Teachers Involved	(Dr A A G Webb,Earth Sciences) (Dr J R Ali,Earth Sciences)		
Course Objectives	Structural Geology is the study of rock deformation. Participants in this cour kinematics, and mechanics of rock deformation, and how to answer structural involve heavy use and generation of geological maps and cross sections and structure.	geology questions	s. The course will
Course Contents & Topics	Class-room based: lecture and laboratory  - Introduction: basics on stress, strain, stress-strain relation - Stress - Stereonets - Deformation mechanisms - Strain - Joints - Rheology		

	- Fault pla - Folds - Shear Zo - Fabrics (	foliations, lineations)				
	<ul> <li>Contractional and extensional systems</li> <li>Kink method for cross-section construction</li> <li>Structurally focused map interpretation</li> <li>Balanced cross sections</li> <li>Key Structures in HK</li> </ul>					
	- Folds plu	ıs - Ma Shi Chau	s an associated day of self-survenced fold limb Ma Tso Lung	ey work		
Course Learning	On succes	ssful completion of this	course, students should be able	to:		
Outcomes	CLO 1	understand a mod	lerate level rock deformation			
	CLO 2	interpret structural	data from a geology map			
	CLO 3	plot and interpret s	structural data on a stereonet			
	CLO 4	appreciate 3D rocl	k and 4D rock-time relationships	3		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EASC2402 and EASC3402					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2		Examination	Dec	
Grade Descriptors (A+ to F)	В	complex, familiar and unfamiliar situations; highly effective fieldwork skills and techniques; critical use of data and results to draw appropriate and insightful conclusions; integration of the full range of appropriate theories, principles, evidence and techniques.				
	С	integration of theories, principles, evidence and techniques.  General but incomplete grasp of the subject; evidence of some critical abilities and logical thinking; apply knowledge to most familiar situations; moderately effective fieldwork skills and techniques; mostly correct but some erroneous use of data and results to draw appropriate conclusions; some partial integration of theories, principles, evidence and techniques.				
	D	Limited grasp of the subject, retention of some relevant information of the subject; evidence and techniques. Limited grasp of the subject, retention of some relevant information of the subject; evidence of limited critical abilities; limited ability to apply knowledge to solve problems; partially effective fieldwork skills and techniques; limited ability to use data and results to draw appropriate conclusions; limited integration of theories, principles, evidence and techniques.				
	Fail					
Course Type	Lecture w	ith laboratory componer	nt course			
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures		eleven 2-hour sessions			
	Laborator	у	stereonets, map interpretation	stereonets, map interpretation with a structural focus		
	Field worl	k	3 days field work	· · ·		
	Project w		additional 1-2 days self directed 'field' studies of facing stones showing interesting structural features		20	
	Reading /	Self study			50	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		60	CLO 1,2,3,4	
				40	CLO 1,2,3,4	
Required/recommended reading and online materials	Davis, Re Suppe. 19 Twiss & M	Examination 40 CLO 1,2,3,4 Davis, Reynolds & Kluth. 2012. Structural geology of rocks and regions, 3rd edition. # 551.8 D2. Suppe. 1985. Principles of structural geology, # 551.8 S95. Twiss & Moores. 2007. Structural Geology, 2nd edition. # 551.8 T974. van der Pluijm & Marshak. 2004. Earth structure: an introduction to structural geology and tectonics. # 551.8 V21.				
Additional Course Information	Structural	geology has lots of ass	cociated textbooks with many in our named works are not require	the HKU library. Furthermore t		

EASC3405	Environmental remote sensing (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	36
Course Co-ordinator	Dr J Michalski, Earth Sciences (jmichal@hku.hk)	·	
Teachers Involved	(Dr J Michalski, Earth Sciences)		
Course Objectives	This course serves as an introduction to remote sensing of the Earth an on remote sensing of the Earth using visible, infrared, and microwave ra Familiarity with remote sensing data is an essential skill for the moscientist. This course will teach you not only about the fundamentals such as: 1) how to obtain remote sensing data, 2) how to process, coresults to scientific problems, 4) how to report on your results, 5) how to represent your new skills on your CV.	adiation.  Indication day geoscientist an of remote sensing, but also rrect and interpret images.	d environmental so practical skills (3) how to apply
Course Contents & Topics	1. Explanation of the fundamentals of remote sensing 2. Description of key remote sensing platforms, sensers and their purpo 3. How to obtain data of sites on Earth and other planets. 4. How to process, analyse and correct remote sensing data. 5. How to interpret remote sensing data. 6. How to use software for remote sensing. You will be an expert in high 7. How to integrate remote sensing data with Geographic Information S 8. How to apply remote sensing to modern problems in geoscience, cl science. 9. How to relate your work to bigger career goals and how to be a profes	nly employable skills if you ystems (GIS) imate science, planetary s	

Course Learning	10. How to integrate your new skills into your CV so that you have an advantage in the job market.  On successful completion of this course, students should be able to:							
Outcomes	CLO 1 demonstrate knowledge of how remotely sensed data are acquired							
	CLO 2		sic techniques of image processing					
	CLO 3							
	CLO 4							
		CLO 5 evaluate and interpret remotely sensed data						
	CLO 6							
Pre-requisites			406 or EASC2407 or ENVS2002					
(and Co-requisites and Impermissible combinations)	1 435 111 2							
Offer in 2017 - 2018	Y 2n	d sem Offer in 2018	3 - 2019 : Y	Examination	n No Exam			
Grade Descriptors (A+ to F)	A	strong analytical and cr unfamiliar situations. Corganizational and pres		apply knowledge to a wide rang opriate and insightful conclusion	ge of complex, familiar and ns. Apply highly effective			
	В	learning outcomes. Sho	al command of a broad range of knowledge a w evidence of analytical and critical abilities an uations. Correct use of data and results to dr. s.	nd logical thinking, and ability to a	apply knowledge to familia			
	С	outcomes. Show evide familiar situations. Mos	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately					
	D	effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities, and limited ability to apply knowledge to solve problems. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
		effective organizational		to draw appropriate conclusion	is. Apply liftlited of barely			
	Fail	Demonstrate little or no of analytical and critical		s required for attaining the cours  volittle or no ability to apply know	e learning outcomes. Lack			
Course Type		Demonstrate little or no of analytical and critica Misuse of data and res	and presentational skills. evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate conclu-	s required for attaining the cours  volittle or no ability to apply know	e learning outcomes. Lack			
		Demonstrate little or no of analytical and critica Misuse of data and res effective or ineffective. with laboratory compo	and presentational skills. evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate conclu-	s required for attaining the cours  volittle or no ability to apply know	e learning outcomes. Lack			
Course Teaching	Lecture v	Demonstrate little or no of analytical and critica Misuse of data and res effective or ineffective. with laboratory compo	and presentational skills. evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate concluse.  nent course	s required for attaining the cours  volittle or no ability to apply know	se learning outcomes. Lack wledge to solve problems. ational skills are minimally			
Course Teaching	Lecture v	Demonstrate little or no of analytical and critica Misuse of data and res effective or ineffective. with laboratory compo	and presentational skills. evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate concluse.  nent course	s required for attaining the cours  volittle or no ability to apply know	se learning outcomes. Lack wledge to solve problems ational skills are minimally			
Course Teaching	Lecture v Activitie Lectures Laborato	Demonstrate little or no of analytical and critica Misuse of data and res effective or ineffective. with laboratory composes	and presentational skills. evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate concluse.  nent course	s required for attaining the cours  volittle or no ability to apply know	No. of Hours 24 24			
Course Teaching	Lecture v Activitie Lectures Laborato Project v	Demonstrate little or no of analytical and critical Misuse of data and reseffective or ineffective. with laboratory composes as pry	and presentational skills. evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate concluse.  nent course	s required for attaining the cours  volittle or no ability to apply know	No. of Hours 24 24 12			
Course Teaching & Learning Activities	Lecture v Activitie Lectures Laborato Project v Reading	Demonstrate little or no of analytical and critica Misuse of data and reseffective or ineffective. with laboratory composes or ywork	and presentational skills.  evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate conclus  nent course  Details	s required for attaining the cours v little or no ability to apply kno sions. Organization and present	No. of Hours 24 24 12 100			
Course Teaching & Learning Activities  Assessment Methods	Lecture v Activitie Lectures Laborato Project v	Demonstrate little or no of analytical and critica Misuse of data and reseffective or ineffective. with laboratory composes or ywork	and presentational skills. evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate concluse.  nent course	s required for attaining the cours  volittle or no ability to apply know	No. of Hours 24 24 12			
Course Teaching & Learning Activities  Assessment Methods	Lecture v Activitie Lectures Laborato Project v Reading	Demonstrate little or no of analytical and critica Misuse of data and resemble of the defective or ineffective. With laboratory composes and the defective of the defective of the defective or ineffective. With laboratory composes and the defective of the defective or ineffective	and presentational skills.  evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate conclus  nent course  Details	s required for attaining the cours  / little or no ability to apply kno- sions. Organization and present  Weighting in final	No. of Hours 24 24 12 100 Assessment Methods			
Course Teaching & Learning Activities  Assessment Methods	Lecture v Activitie Lectures Laborato Project v Reading Methods	Demonstrate little or no of analytical and critica Misuse of data and resemble of data and re	and presentational skills. evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate conclus  nent course  Details  Details	s required for attaining the cours viittle or no ability to apply know sions. Organization and present  Weighting in final course grade (%)	No. of Hours 24 24 22 100 Assessment Methods to CLO Mapping			
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Lecture v Activitie Lectures Laborato Project v Reading Methods	Demonstrate little or no of analytical and critica Misuse of data and resemble of data and re	and presentational skills.  evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate conclus  nent course  Details  Details  Written assignments (weekly)	weighting in final course grade (%)	No. of Hours 24 24 22 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6			
Course Teaching & Learning Activities Assessment Methods	Lecture v Activitie Lectures Laborato Project v Reading Methods  Assignm Project r Test Remote s Author(s) Publishe Edition : Print ISB eText ISB	Demonstrate little or no of analytical and critical Misuse of data and resemble of data and r	and presentational skills.  evidence of command of knowledge and skills    a bilities, logical and coherent thinking. Show ults and/or unable to draw appropriate conclusionent course  Details  Details  Written assignments (weekly)  Report on a topic of interest  Two in-class examination (25% each)  and Applications (3rd edition)	weighting in final course grade (%)  Weighting in final course 30  40  10  50	No. of Hours  24 24 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6			
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Lecture v Activitie Lectures Laborato Project v Reading Methods  Assignm Project r Test Remote S Author(s) Publishe Edition : Print ISB eText ISB	Demonstrate little or no of analytical and critical Misuse of data and resemble of data and r	and presentational skills.  evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate conclusionent course  Details  Details  Written assignments (weekly) Report on a topic of interest Two in-class examination (25% each) and Applications (3rd edition)	weighting in final course grade (%)  Weighting in final course 30  40  10  50	No. of Hours  No. of Hours  24  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6			
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lecture v Activitie Lectures Laborato Project v Reading Methods  Assignm Project r Test Remote S Author(s) Publisher Edition : Print ISB eText ISB	Demonstrate little or no of analytical and critica Misuse of data and resemble of data and re	and presentational skills.  evidence of command of knowledge and skills I abilities, logical and coherent thinking. Show ults and/or unable to draw appropriate conclusionent course  Details  Details  Written assignments (weekly) Report on a topic of interest Two in-class examination (25% each) and Applications (3rd edition)	weighting in final course grade (%)  Weighting in final course 30  40  10  50	No. of Hours  No. of Hours  24  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6			

EASC3406	Reconst	uction of past climate (6 credits)		Academic Year	2017		
Offering Department	Earth Scie	nces		Quota			
Course Co-ordinator	Dr S H Li,	Earth Sciences (shli@hku.hk)					
Teachers Involved	(Dr S H Li,Earth Sciences)						
Course Objectives	This course provides students with an understanding of how dynamic earth is and how it has changed over the last 2.6 million years. This course introduces the theory and methods of climate reconstructions.						
Course Contents & Topics	Climate ch Driven ford Quantitativ Pollen ana Climate ch Quaternar Climate ch Climate ch Global war	rnary period (1), anges in the last 2.6 million years (1), es of climate change (1) e reconstruction methods (1) ysis and biological proxies (2) ange in arid regions (1) geochronology (1) anges in East Asia (1) ange impacts on human evolution and society (1) ming and future climate change (1) ange in Asia and Europe					
Course Learning		sful completion of this course, students should be able to:					
Outcomes	CLO 1 understand the earth climate change during last 2.6 million years						
	CLO 2	understand the driving forces of climate changes in different	ent scales				
	CLO 3	learn the methods for palaeo-environment reconstruction					
	CLO 4	understand the impacts of climate changes					
	CLO 5 synthesize and interpret data sets of climate change proxies						
Pre-requisites	Pass in EA	SC2401					

(and Co-requisites and Impermissible combinations)							
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	019 : N	Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familia and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	outcomes. Show evidence		e and skills required for attaining most ties and logical thinking, and ability to a d presentational skills.			
	D	Show evidence of some con	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture wi	th laboratory componen	t course				
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures		12 sessions x 2 hours	24			
	Laboratory		2 sessions	4			
	Field worl	(	1 half-day fieldtrip	5			
	Tutorials		8 sessions		16		
	Reading /	Self study			90		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			50	CLO 1,2,3,5		
	Examination			50	CLO 1,2,3,4		
Required/recommended reading and online materials	Longman, W.F. Rudo	J. Lowe and M.J.C. Walker Reconstructing Quaternary Environments. (Harlow, Essex : Addison Wesley ongman, 1997, 2nd ed)  /.F. Ruddiman: Earths climate: Past and future (Freeman, 2008, 2nd ed.)					
Additional Course Information			A.G. Parker: Global Environm 6C2131 A Cool World: Ice Ag	nents through the Quaternary (Ox les and Climate Change	dora, 2007)		

EASC3408	Geophy	sics (6 credits)	Acad	lemic Year	2017
Offering Department	Earth Sc		Quot	а	
Course Co-ordinator	Prof P P	C Wu, Earth Sciences (p)	owu@hku.hk)		
Teachers Involved	(Dr B Zh	ang,Earth Sciences) C Wu,Earth Sciences)	<del>-</del>		
Course Objectives	geophysi	cal disciplines, including	characteristics and processes of the solid earth a seismology, gravity, geothermometry, geomagnetise thods for studying the earth's interior and near subs	sm and pal	eomagnetism, as
Course Contents & Topics	- Gravity - Isostas - Geoma - Paleom - Therma - Earthqu - Seismic - Applied - Applied	agnetism and rock magne Il Properties of the Earth lake Seismology waves and free oscillatio Geophysical Methods: se Geophysical Methods: El	etism ins eismic method lectrical methods		
Course Learning Outcomes	CLO 1 CLO 2 CLO 3 CLO 4	describe the approaches apply basic techniques in describe the procedure to understand the methods of	ourse, students should be able to: and methods geophysicists use to study the interior measurements of earthquakes and interpret a seism determine gravity anomalies and their interpretation of paleomagnetism and describe the processes of ro ssure and temperature of the earth's interior are dete	nogram n ock magneti	
Pre-requisites (and Co-requisites and Impermissible combinations)		EASC2401 or EASC2402	•		
Offer in 2017 - 2018	Y 2n	d sem Offer in 2018 - 20	019 : Y Exam	nination	May
Grade Descriptors (A+ to F)	A Demonstrated an in-depth understanding of the subject well above the expected level of an university undergraduate and achieving over 80% of total marks and an ability to pursue advance-level study in some of the geophysics subdisciplines.				
,	B Demonstrate an understanding of the subject at the appropriate level of a university student and achieving 70% of the total course marks. A greater effort and further preparation are needed if student plans to pursue further study of geophysics.				
	C Coursework and examination results reflect only only a basic understanding of the subject without the ability to carry out in-depth analysis. Achieved 60-70% of total course marks.  Demonstrated an insufficient understanding of the subject as total course mark achieved is below 60%. The pass grade is				
	D	reflective only of the time the	student puts in on the subject.		
_	Fail		fficient ability to understand the subject and failure to achieve 50%	% of the availa	ble course marks.
Course Type		vith laboratory component			
Course Teaching	Activities		Details		No. of Hours
	Lectures		12 sessions x 2 hours		
& Learning Activities			8 paper exercises, 2 field exercises on explo	oration	24
	Laborato			oration	24 24 100

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		24	CLO 1,2,3
	Examination		60	CLO 1,2,3,4,5
	Laboratory reports		16	CLO 1,2,3,4,5

EASC3409	Igneous	and metamorphic	petrogenesis (6 credits)	Academic Yea	<b>r</b> 2017			
Offering Department	Earth Scie		· · · · · · · · · · · · · · · · · · ·	Quota	30			
Course Co-ordinator	Prof M Su	in, Earth Sciences (mins	sun@hku.hk)	·				
Teachers Involved	(Prof G Zh	nao,Earth Sciences)						
		un,Earth Sciences)						
Course Objectives		To provide a comprehensive coverage of the principles and techniques used in the study of petrogenesis of gneous and metamorphic rocks and their cause-and-effect relationships with tectonic settings and crustal evolution.						
Course Contents & Topics	- Applicati - Basaltic - Granitic - Magmati - Magmati - Types of - Chemica - Metamoi - Metamoi - Metamoi - Metamoi	Magma generation: physiochemical conditions and tectonic settings.  Application of trace elements and isotopes to the study of magma genesis  Basaltic magmatism and mantle characteristics  Granitic magma and crustal characteristics  Magmatism at convergent boundaries  Magmatism and crustal growth  Types of metamorphism  Chemical equilibrium/disequilibrium in metamorphism; metamorphic phase diagrams (ACF, A'KF, AFM, etc)  Metamorphic petrogenesis and evolution of pelitic rocks  Metamorphic petrogenesis and evolution of mafic rocks  Metamorphism in different tectonic settings; metamorphic pressure-temperature-time (P-T-t) paths and their ectonic implications.						
Course Learning			course, students should be able to	:				
Outcomes	CLO 1 us	se rock associations, te ajor igneous rocks	extures, structures and geochemic	cal characteristics to infer th	e petrogenesis of			
	CLO 2 use magmatic rocks to study the mantle and crustal characteristics CLO 3 apply mineral assemblages, microtextures, mineral reaction relationships and metamorphic P-T paths to infer the tectonothermal evolution of metamorphic rocks							
	CLO 4 demonstrate knowledge and understanding of magmatic and metamorphic processes and their cause-and effect relationships with tectonic settings and crustal evolution							
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in E	ASC3402						
Offer in 2017 - 2018	Y 2nd	d sem Offer in 2018 - 2	2019 : Y	Examination	May			
Grade Descriptors (A+ to F)	A Demonstrate extensive knowledge and skills at an advanced level required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, and ability to apply highly effective lab skills and techniques to solve problems. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.							
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply effective lab skills and techniques to solve problems. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.							
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply moderately effective lab skills and techniques to solve problems. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.							
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities, and limited ability to apply partially effective lab skills and techniques to solve problems. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.							
	Fail	of analytical and critical abitechniques to solve proble	idence of command of knowledge and skills illities, logical and coherent thinking, and ab ems. Misuse of data and results and/or unimally effective or ineffective.	ility to apply minimally effective or i	neffective lab skills an			
Course Type	Lecture w	ith laboratory componer	nt course					
Course Teaching	Activities	3	Details		No. of Hours			
Learning Activities	Lectures				24			
	Laborator				24			
		/ Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme			40	CLO 1,2,3,4			
	Examinat	ion		60	CLO 1,2,3,4			
eading and	M.G. Best	: Igneous and Metamor	phic Petrology (Oxford Blackwell S	science, 2003, 2nd ed.)				
		•	phic Petrology (Oxford Blackwell S	,				

EASC3410	Hydrogeology (6 credits)	Academic Year	2017				
Offering Department	Earth Sciences	Quota	40				
Course Co-ordinator	Prof J J Jiao, Earth Sciences (jjiao@hku.hk)						
Teachers Involved	(Prof J J Jiao, Earth Sciences)						
Course Objectives	This course aims to introduce some basic concepts and theories of groundwater	flow with special	reference to case				

		head and flow net				
			(2 weeks) vater Flow (1 Week)			
		ater Flow To Wells				
	Analysis	Of Aquifer Test(2 V	Neeks)			
			test design(1 Week)			
			Systems (HK case study)(1 Week	3)		
Carres I sameina			(China case study)(Week 12)	hla ta		
Course Learning Outcomes			f this course, students should be all rtance of hydrogeology in geotechr		oring	
Jutcomes			oncepts of hydrological cycle and v			
		ind surface water	oncepts of flydrological cycle and v	vater balance, and interaction b	etween groundwater	
			e relationship between groundwater	r system and geology and topog	raphy	
	CLO 4 u	nderstand basic co	oncepts of aquifer and aquifer prop	erties, hydraulic head, flow net,	and basic principles	
	0	f groundwater flow				
			er tests to estimate some importan	t aquifer parameters		
Pre-requisites	Pass in E	ASC2402				
(and Co-requisites						
and Impermissible						
	V 4	0.00	10 0010 \	<b>-</b>	D	
Offer in 2017 - 2018			18 - 2019 : Y	Examination		
Offer in 2017 - 2018 Grade Descriptors	Y 1s	Demonstrate thorou	igh mastery at an advanced level of exter	nsive knowledge and skills required fo	r attaining all the course	
Offer in 2017 - 2018		Demonstrate thorou learning outcomes. to apply knowledge	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational	r attaining all the course riginal thought, and ability and presentational skills.	
Offer in 2017 - 2018 Grade Descriptors		Demonstrate thorou learning outcomes: to apply knowledge becomes become the property of the pr	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowle	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational edge and skills required for attaining at	r attaining all the course riginal thought, and ability and presentational skills. least most of the course	
Offer in 2017 - 2018 Grade Descriptors	A	Demonstrate thorou learning outcomes. to apply knowledge Demonstrate substalearning outcomes.	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler initial command of a broad range of knowle Show evidence of analytical and critical abi	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational edge and skills required for attaining at illities and logical thinking, and ability to	r attaining all the course riginal thought, and ability and presentational skills. least most of the course	
Offer in 2017 - 2018 Grade Descriptors	A	Demonstrate thorou learning outcomes: to apply knowledge to Demonstrate substate learning outcomes: practical problems. A Demonstrate generation of the problems and the problems are the problems and the problems are the problems and the problems are the problem	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler initial command of a broad range of knowle Show evidence of analytical and critical abily Apply effective organizational and presentat al but incomplete command of knowledge	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational edge and skills required for attaining at illties and logical thinking, and ability to ional skills.	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most at of the course learning	
combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	В	Demonstrate thorou learning outcomes. It to apply knowledge to Demonstrate substallearning outcomes. It practical problems. A Demonstrate genera outcomes. Show ev	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowle Show evidence of analytical and critical ability Apply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical ability	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational edge and skills required for attaining at illities and logical thinking, and ability to ional skills. e and skills required for attaining mos ties and logical thinking, and ability to	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most at of the course learning	
Offer in 2017 - 2018 Grade Descriptors	B C	Demonstrate thorou learning outcomes. It oapply knowledge I Demonstrate substalearning outcomes. I practical problems. I Demonstrate genera outcomes. Show ever practical problems. It	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler initial command of a broad range of knowle Show evidence of analytical and critical abi Apply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical abilit Apply moderately effective organizational ar	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational edge and skills required for attaining at illities and logical thinking, and ability to ional skills. e and skills required for attaining most ties and logical thinking, and ability to a dropresentational skills.	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to mos to of the course learning apply knowledge to some	
Offer in 2017 - 2018 Grade Descriptors	В	Demonstrate thorou learning outcomes. It o apply knowledge ! Demonstrate substate learning outcomes. It opposes practical problems. A Demonstrate genera outcomes. Show ev practical problems. A Demonstrate partial Show evidence of sc	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowle Show evidence of analytical and critical abi Apply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical abilit Apply moderately effective organizational ar but limited command of knowledge and sk ome coherent and logical thinking, but with	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational edge and skills required for attaining at illities and logical thinking, and ability to ional skills. required for attaining mose ties and logical thinking, and ability to a did presentational skills. cills required for attaining some of the co- limited analytical and critical abilities. Si	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most at of the course learning apply knowledge to some ourse learning outcomes now limited ability to apply	
Offer in 2017 - 2018 Grade Descriptors	A B C	Demonstrate thorou learning outcomes. It to apply knowledge it Demonstrate substal learning outcomes. It Demonstrate genera outcomes. Show ever practical problems. A Demonstrate partial Show evidence of sknowledge to solve process.	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowle Show evidence of analytical and critical ability Apply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical ability Apply moderately effective organizational ar but limited command of knowledge and sk ome coherent and logical thinking, but with practical problems. Apply limited or barely e	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational edge and skills required for attaining at illities and logical thinking, and ability to ional skills. equired for attaining mos ties and logical thinking, and ability to and presentational skills. ills required for attaining some of the c limited analytical and critical abilities. Sl effective organizational and presentation	r attaining all the course riginal thought, and ability, and presentational skills. least most of the course apply knowledge to most to of the course learning apply knowledge to some ourse learning outcomes. now limited ability to apply al skills.	
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Offer in 2017 - 2018 Grade Descriptors (A+ to F)	A B C D	Demonstrate thorou learning outcomes. It o apply knowledge It Demonstrate substate learning outcomes. It practical problems. A Demonstrate genera outcomes. Show ev practical problems. A Demonstrate partial Show evidence of sknowledge to solve It Demonstrate little or of analytical and crit problems. Organizat	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowle Show evidence of analytical and critical abipaply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical abilitapply moderately effective organizational ar but limited command of knowledge and skome coherent and logical thinking, but with practical problems. Apply limited or barely erno evidence of command of knowledge an ical abilities, logical and coherent thinking, tion and presentational skills are minimally evidence.	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational adge and skills required for attaining at illities and logical thinking, and ability to ional skills. required for attaining mose ties and logical thinking, and ability to a different properties of the colling and the illis required for attaining some of the collimited analytical and critical abilities. Sliffective organizational and presentation d skills required for attaining the course Show very little or no ability to apply kn	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most to f the course learning apply knowledge to some ourse learning outcomes. low limited ability to apply al skills. e learning outcomes. Lack	
Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type	A B C D Fail	Demonstrate thorou learning outcomes. It o apply knowledge It Demonstrate substate arming outcomes. It practical problems. A Demonstrate genera outcomes. Show ev practical problems. A Demonstrate partial Show evidence of sknowledge to solve problems. Demonstrate little or of analytical and crit problems. Organizativith laboratory com	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowled Show evidence of analytical and critical abily Apply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical ability Apply moderately effective organizational arbut limited command of knowledge and skome coherent and logical thinking, but with practical problems. Apply limited or barely erno evidence of command of knowledge an ical abilities, logical and coherent thinking, bit on and presentational skills are minimally exponent course	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational adge and skills required for attaining at illities and logical thinking, and ability to ional skills. required for attaining mose ties and logical thinking, and ability to a different properties of the colling and the illis required for attaining some of the collimited analytical and critical abilities. Sliffective organizational and presentation d skills required for attaining the course Show very little or no ability to apply kn	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most of the course learning apply knowledge to some ourse learning outcomes now limited ability to apply al skills. Plearning outcomes. Lackowledge to solve practical	
Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail Lecture v Activitie	Demonstrate thorou learning outcomes. It o apply knowledge It Demonstrate substate learning outcomes. It of Demonstrate general outcomes. Show ev practical problems. Demonstrate partial Show evidence of sknowledge to solve problems. Demonstrate little or of analytical and crit problems. Organizativith laboratory comessive the problems. Organizativith laboratory comessive to apply the problems. Organizativith laboratory comessive to apply the problems.	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowle Show evidence of analytical and critical ability all but incomplete command of knowledge idence of some analytical and critical ability apply moderately effective organizational ar but limited command of knowledge and stome coherent and logical thinking, but with practical problems. Apply limited or barely eno evidence of command of knowledge and ical abilities, logical and coherent thinking, but on and presentational skills are minimally exponent course    Details	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational adge and skills required for attaining at illities and logical thinking, and ability to ional skills. required for attaining mose ties and logical thinking, and ability to a different properties of the colling and the illis required for attaining some of the collimited analytical and critical abilities. Sliffective organizational and presentation d skills required for attaining the course Show very little or no ability to apply kn	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most of the course learning apply knowledge to some ourse learning outcomes. ow limited ability to apply al skills. It learning outcomes. Lack owledge to solve practica	
Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	B C D Fail Lecture v Activitie Lectures	Demonstrate thorou learning outcomes. to apply knowledge ! Demonstrate substate learning outcomes. In Demonstrate genera outcomes. Show ev practical problems. In Demonstrate partial Show evidence of sknowledge to solve problems. Demonstrate little or of analytical and crit problems. Organizativith laboratory comes.	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowle Show evidence of analytical and critical abil Apply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical abilit Apply moderately effective organizational ar but limited command of knowledge and skome coherent and logical thinking, but with practical problems. Apply limited or barely en o evidence of command of knowledge and is alial abilities, logical and coherent thinking, sition and presentational skills are minimally exponent course    Details	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational adge and skills required for attaining at illities and logical thinking, and ability to ional skills. required for attaining mose ties and logical thinking, and ability to a different properties of the colling and the illis required for attaining some of the collimited analytical and critical abilities. Sliffective organizational and presentation d skills required for attaining the course Show very little or no ability to apply kn	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most of the course learning apply knowledge to some ourse learning outcomes. ow limited ability to apply al skills. It learning outcomes. Lack owledge to solve practica  No. of Hours  24	
Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail Lecture v Activitie Lectures Laborato	Demonstrate thorou learning outcomes. to apply knowledge it Demonstrate substal learning outcomes. Demonstrate genera outcomes. Show ev practical problems. Demonstrate partial Show evidence of sknowledge to solve pemonstrate little or of analytical and crit problems. Organizat vith laboratory comes.	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowled Show evidence of analytical and critical abid Apply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical ability and command of knowledge and sk one coherent and logical thinking, but with practical problems. Apply limited or barely ended of command of knowledge and is a problem or covered thinking. Since a logical and coherent thinking is a proponent course to the course of t	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational adge and skills required for attaining at illities and logical thinking, and ability to ional skills. required for attaining mose ties and logical thinking, and ability to a different properties of the colling and the illis required for attaining some of the collimited analytical and critical abilities. Sliffective organizational and presentation d skills required for attaining the course Show very little or no ability to apply kn	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most of the course learning apply knowledge to some ourse learning outcomes now limited ability to apply al skills. e learning outcomes. Lack owledge to solve practica  No. of Hours  24  20	
Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail Lecture v Activitie Lectures Laborato Field wo	Demonstrate thorou learning outcomes. It to apply knowledge it Demonstrate substal learning outcomes. It Demonstrate general outcomes. Show ever practical problems. A Demonstrate partial Show evidence of sknowledge to solve problems. Demonstrate little or of analytical and critical problems. Organizativith laboratory comes.	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowle Show evidence of analytical and critical abil Apply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical abilit Apply moderately effective organizational ar but limited command of knowledge and skome coherent and logical thinking, but with practical problems. Apply limited or barely en o evidence of command of knowledge and is alial abilities, logical and coherent thinking, sition and presentational skills are minimally exponent course    Details	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational adge and skills required for attaining at illities and logical thinking, and ability to ional skills. required for attaining mose ties and logical thinking, and ability to a different properties of the colling and the illis required for attaining some of the collimited analytical and critical abilities. Sliffective organizational and presentation d skills required for attaining the course Show very little or no ability to apply kn	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most of the course learning apply knowledge to some ourse learning outcomes now limited ability to apply al skills.  e learning outcomes. Lack owledge to solve practica  No. of Hours  24  20  5	
Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching Learning Activities	B C D Fail Lecture v Activitie Lectures Laborato Field wo Reading	Demonstrate thorou learning outcomes. to apply knowledge it Demonstrate substal learning outcomes. In Demonstrate general outcomes. Show ever practical problems. In Demonstrate partial Show evidence of sknowledge to solve in Demonstrate little or of analytical and critical problems. Organizativith laboratory committed in Demonstrate of the problems. Organizativith laboratory committed in Demonstrate in Demon	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowled Show evidence of analytical and critical ability and presentate at but incomplete command of knowledge idence of some analytical and critical ability and critical ability and command of knowledge and sk one coherent and logical thinking, but with practical problems. Apply limited or barely end of knowledge and sk one coherent and logical thinking, but with practical problems. Apply limited or barely end of knowledge and sk one coherent and logical thinking. Sut with practical problems are no evidence of command of knowledge and ical abilities, logical and coherent thinking. Sition and presentational skills are minimally exponent course    Details   12 sessions x 2 hours   10 x 2 hours   10 x 1 kg   10	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational edge and skills required for attaining at edge and skills required for attaining at illities and logical thinking, and ability to ional skills. For each stills required for attaining most and presentational skills. For each stills required for attaining some of the collimited analytical and critical abilities. Stiffective organizational and presentation at skills required for attaining the course show very little or no ability to apply kneed to the still still sequired for attaining the course show very little or no ability to apply kneed to the still still sequired for attaining the course show very little or no ability to apply kneed to the still sequired for attaining the course show very little or no ability to apply kneed to the still sequired for attaining the course show very little or no ability to apply kneed to the still sequired for attaining the course show very little or no ability to apply kneed to the still sequired for attaining the course show very little or no ability to apply kneed to the still sequired for attaining the course show very little or no ability to apply kneed to the still sequired for attaining the course show very little or no ability to apply kneed to the still sequired for attaining the sequired for attaining the still sequired for attaining the sequ	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most of the course learning apply knowledge to some ourse learning outcomes now limited ability to apply al skills. Learning outcomes. Lack owledge to solve practical No. of Hours  24  20  5  100	
Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	A B C D Fail Lecture v Activitie Lectures Laborato Field wo	Demonstrate thorou learning outcomes. to apply knowledge it Demonstrate substal learning outcomes. In Demonstrate general outcomes. Show ever practical problems. In Demonstrate partial Show evidence of sknowledge to solve in Demonstrate little or of analytical and critical problems. Organizativith laboratory committed in Demonstrate of the problems. Organizativith laboratory committed in Demonstrate in Demon	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowled Show evidence of analytical and critical abid Apply effective organizational and presentat al but incomplete command of knowledge idence of some analytical and critical ability and command of knowledge and sk one coherent and logical thinking, but with practical problems. Apply limited or barely ended of command of knowledge and is a problem or covered thinking. Since a logical and coherent thinking is a proponent course to the course of t	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational adge and skills required for attaining at illities and logical thinking, and ability to ional skills. required for attaining mose ties and logical thinking, and ability to a different properties of the colling and the illis required for attaining some of the collimited analytical and critical abilities. Sliffective organizational and presentation d skills required for attaining the course Show very little or no ability to apply kn	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most of the course learning apply knowledge to some ourse learning outcomes now limited ability to apply al skills. learning outcomes. Lack owledge to solve practical  No. of Hours  24  20  5  100  Assessment Methods	
Offer in 2017 - 2018 Grade Descriptors	B C D Fail Lecture v Activitie Lectures Laborato Field wo Reading	Demonstrate thorou learning outcomes. So practical problems. Demonstrate substate learning outcomes. Spractical problems. Demonstrate genera outcomes. Show ev practical problems. Demonstrate partial Show evidence of sknowledge to solve poemonstrate little or of analytical and crit problems. Organizat with laboratory comes.	gh mastery at an advanced level of exter Show strong analytical and critical abilities to a wide range of complex practical probler intial command of a broad range of knowled Show evidence of analytical and critical ability and presentate at but incomplete command of knowledge idence of some analytical and critical ability and critical ability and command of knowledge and sk one coherent and logical thinking, but with practical problems. Apply limited or barely end of knowledge and sk one coherent and logical thinking, but with practical problems. Apply limited or barely end of knowledge and sk one coherent and logical thinking. Sut with practical problems are no evidence of command of knowledge and ical abilities, logical and coherent thinking. Sition and presentational skills are minimally exponent course    Details   12 sessions x 2 hours   10 x 2 hours   10 x 1 kg   10	nsive knowledge and skills required fo and logical thinking, with evidence of o ms. Apply highly effective organizational edge and skills required for attaining at illities and logical thinking, and ability to ional skills.  The and skills required for attaining most ites and logical thinking, and ability to and presentational skills.  The and skills required for attaining most ites and logical thinking, and ability to and presentational skills.  The analytical and critical abilities. Stiffective organizational and presentation of skills required for attaining the course show very little or no ability to apply kneffective or ineffective.  Weighting in final	r attaining all the course riginal thought, and ability and presentational skills. least most of the course apply knowledge to most of the course learning apply knowledge to some ourse learning outcomes. out imited ability to apply all skills. It learning outcomes. Lack owledge to solve practica  No. of Hours  24  20  5  100  Assessment	

EASC3412	Earth r	resources	(6 credits	5)			Academic Year	2017
Offering Department	Earth Sc	ciences	-				Quota	40
Course Co-ordinator	Prof M F	F Zhou, Ear	th Sciences	(mfzhou@l	hku.hk)			
Teachers Involved		Zhao,Earth F Zhou,Ear	Sciences) th Sciences)					
Course Objectives	understa	To provide students with knowledge about the classification of mineral deposits and their basic features; to understand the processes that lead to their formation; to gain hand on experience with mining procedures. In addition, students should gain knowledge about the world wide distributions of mineral and industrial resources.						
Course Contents & Topics	deposit,	Concepts in mineral deposits and mining industrial; exploration and mining methods, classification of mineral deposit, mineral deposit models, magmatic oxide and sulfide deposits, skarn deposits, porphyre deposits, volcanogenic massive sulfide deposits, coal, oil and gas, resource evaluation.						
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 understand the terminology and nomenclature in the mining industrial and mineral deposits							
	CLO 2 understand factors that are key to the formation of metallic and industrial resources							
	CLO 3 understand the controls of earth resources in a global scale							
	CLO 4 understand methods of exploration and exploitation for mineral deposits							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in I	EASC2402	or EASC340	02				
Offer in 2017 - 2018	Y 1s	st sem Of	fer in 2018 -	2019 : Y			Examination	Dec
Grade Descriptors (A+ to F)	A	course le	arning outcome	es. Show stro	ong analytical and	vel of extensive knowledge d critical abilities and logic Highly effective organization	al thinking. Evidence	of original thoughts,
	В	course lea	arning outcomes	s. Show analy		evel of extensive knowledge bilities and logical thinking. skills.		
	С	· ·						

	Demonstrate partial but limited understanding for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to solve problems. Apply limited or barely effective organizational and presentational skills.						
	abi	Fail No or little knowledge about the subject. No evidence for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Very little or no ability for field observation and for solving problems. Poor organization and presentational skills.					
Course Type	Lecture with la	aboratory componer	nt course				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures		2 hour lectures per week	for 10 weeks	20		
	Laboratory				20		
	Field work		1 overseas camp	40			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Oversea field trip (comp	ulsory) 20	CLO 1,2,4		
	Examination			60	CLO 1,2,3,4		
	Laboratory re	ports		20	CLO 1,2		
Required/recommended reading and online materials	TBC						

EASC3413	Enginee	ering geology (6	credits)	Academic Ye	ar   2017		
Offering Department	Earth Scient	ences		Quota	35		
Course Co-ordinator	Dr L N Y	Or L N Y Wong, Earth Sciences ( <i>Inywong@hku.hk</i> )					
Teachers Involved		(Dr L N Y Wong,Earth Sciences) (Prof J J Jiao,Earth Sciences)					
Course Objectives		nt some of the cond by case histories.	cepts and skills of importance in the	e profession of Engineering Go	eology and illustrat		
Course Contents & Topics	Introduction (air photo	Introduction to engineering design and the role of the Engineering Geologist; site investigation concepts and skills (air photo interpretation, soil and rock description, engineering geological plans, reporting); slopes, foundations. Case histories from Hong Kong.					
Course Learning			this course, students should be able	e to:			
Outcomes	CLO 1 ap er CLO 2 m	opreciate how civil ngineering projects, ake simple engineer	engineering design is carried ou particularly the economic- and safe ering-geological models and unders tion design should be carried out	t and understand the work o ty-critical duties			
	CLO 3 ca		photo interpretation tasks and elem	entary soil and rock descriptio	n and classification		
		<u> </u>	es of slope failures and basic metho	ods to control and mitigate land	Islides		
	CLO 5 ca		nalyses using methods such as the				
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in EASC3410 and EASC3414, or already enrolled in these courses This course is only for final year students.					
Offer in 2017 - 2018	Y 2nd	d sem Offer in 201	8 - 2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	В	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cour learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilities apply knowledge and skills to solve a wide range of complex, familiar and unfamiliar practical problems. Apply highly effect organizational and presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cour learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge and skills.					
	to solve familiar and some unfamiliar practical problems. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge and skills to						
	solve most familiar, but not unfamiliar, practical problems. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge and skills to solve familiar practical problems. Apply limited or barely effective organizational and presentational skills.						
	Fail	Demonstrate little or r of analytical and critical	no evidence of command of knowledge and cal abilities, logical and coherent thinking. Siganization and presentational skills are mini	skills required for attaining the course Show very little or no ability to apply	learning outcomes. Lac		
Course Type	Lecture w	ith laboratory comp	onent course				
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborato	ry					
	Field wor	k	half day field trip	half day field trip			
	Reading	/ Self study			90		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	including field report	30	CLO 2,3,4,5		
	Examinat	tion		70	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Goodman	n, R. E.: Engineering	g Geology (Wiley, 1993).				

EASC3414	Soil and rock mechanics (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	40
Course Co-ordinator	Prof J J Jiao, Earth Sciences (jjiao@hku.hk)		
Teachers Involved	(Dr L N Y Wong, Earth Sciences)		

	(Prof J J	Jiao,Earth Sciences)					
Course Objectives	To provide a basic knowledge of soil and rock mechanics for those wishing to consider further studies on a career in engineering geology/geotechnics.						
Course Contents & Topics	Stress and strain; properties and classifications of soil and rock; clay minerals; pore pressure and effective stress; strength and failure criteria, initial stresses and their measurement; deformation; consolidation; planes of weakness in rocks; ground treatment methods.						
Course Learning		On successful completion of this course, students should be able to:					
Outcomes		understand basic conc criteria	epts of stress and stra	in, pore pressure and effective stres	s, strength and failure		
			erties and classifications				
			of rock deformation and	d soil consolidation			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in I	Pass in EASC3410, or already enrolled in this course					
Offer in 2017 - 2018	Y 2r	nd sem Offer in 2018	- 2019 : Y	Examination	on May		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lact of analytical and critical abilities, logical and coherent thinking. Organization and presentational skills are minimally effective o ineffective.					
Course Type	Lecture v	with laboratory compor	nent course				
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures	3					
	Laborate	,					
	Reading	g / Self study			100		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)			
	Assignm	nents		30	CLO 1,2,3		
	Examina			70	CLO 1,2,3		
Required/recommended reading and online materials			napman & Hall, 6th ed.) Rock Mechanics (John				

EASC3415	Meteorology (6 credits)	Academic Year	2017				
Offering Department	Earth Sciences	Quota					
Course Co-ordinator	Dr Z H Liu, Earth Sciences (zhliu@hku.hk)						
Teachers Involved	(Dr M H Lee, Earth Sciences)						
	(Dr Z H Liu, Earth Sciences)						
Course Objectives	This course provides students with a modern understanding of weather by examining at an advanced level the processes that govern atmospheric structure and behavior, weather elements, and weather systems.						
Course Contents & Topics	Energy budget, radiative forcing, and greenhouse effect; stability, conversand pressure; thermodynamic diagrams; weather charts; Forces, winds masses, and fronts; thunderstorms, mid-latitude cyclones, and trop atmosphere; weather forecasting.	ection, and lapse rates; , and general circulatio	equation of state n; Monsoons, air				
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 describe key aspects of weather phenomena						
	CLO 2 explain essential elements of atmospheric processes governing	weather					
	CLO 3 apply physical principles to construct models for some basic as	pects of weather					
	CLO 4 explain synoptic charts (weather maps)						
	CLO 5 interpret Hong Kong weather (typhoons etc.)						
(and Co-requisites and Impermissible combinations)							
Offer in 2017 - 2018	Y 1st sem Offer in 2018 - 2019 : Y	Examination	Dec				
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowled learning outcomes. Show strong analytical and critical abilities and logical the to apply knowledge to a wide range of complex, familiar and unfamiliar situation draw appropriate and insightful conclusions. Show insightful use and critical a range of high quality sources and to quote/reference aptly.	inking, with evidence of originations. Demonstrate critical use	al thought, and ability of data and results to				
	B Demonstrate substantial command of a broad range of knowledge and skill- learning outcomes. Show evidence of analytical and critical abilities and logica and some unfamiliar situations. Demonstrate correct use of data and results of relevant information from sources and ability to make meaningful compa and to quote/reference aptly.	al thinking, and ability to apply to draw appropriate conclusion	knowledge to familiar ins. Show critical use				
	C Demonstrate general but incomplete command of knowledge and skills re outcomes. Show evidence of some analytical and critical abilities and logic familiar situations. Demonstrate mostly correct but some erroneous use of Show use of relevant information from sources and ability to make com quote/reference aptly.	al thinking, and ability to appl data and results to draw app	y knowledge to most ropriate conclusions.				
	D Demonstrate partial but limited command of knowledge and skills required for Show evidence of some coherent and logical thinking, but with limited analytic knowledge to solve problems. Demonstrate limited ability to use data and reserve reference of several sources, but mainly through summary rather than analysis	cal and critical abilities. Show ults to draw appropriate conclu	limited ability to apply				

	of analy problem	strate little or no evidence of command of knowledge and sk tical and critical abilities, logical and coherent thinking. is. Demonstrate misuse of data and results and/or unat ary sources and no critical comparison of them.	Show very little or no ability to ap	pply knowledge to solve
Course Type	Lecture-based cou	urse		
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Project work			36
	Tutorials			12
	Reading / Self stu	ıdy		48
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		25	CLO 1,2,3
	Examination	2-hour written exam	50	CLO 1,2,4
	Project report		25	CLO 1,4,5
Required/recommended reading and online materials	2013).	s, Meteorology Today, An Introduction to Weat leteorology for Scientists and Engineers (Brooks	,	nment (Brooks/Cole,

	ed geochemistry a	ind geochronology (6 credits)	Academic Yea	2017	
Earth Scie			Quota	50	
Prof M F Z	hou, Earth Sciences	(mfzhou@hku.hk)	'		
		,			
	t key concepts of monce problems.	dern geochemistry and geochronology	and their application to	environmental and	
1. Principle	es of radiogenic isotor	oic dating and modern instruments			
2. Zircon l	J-Pb isotopic dating a	nd its application			
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	, 0	0,			
	•	•			
	•		homiotri		
			niemisu y		
		0 1 0	ating earth materials		
			•	mental and Fart	
		inical methods are applied to gain insi	grit into process in environ	inicital and Lait	
		06 or FASC2407			
	=				
Α					
fluxes of materials over geological time periods and on a global scale. Student shows the ability to apply highly effective					
organizat-ional and presentational skills.					
В	Student demonstrates su	bstantial command of a broad range of knowled	ige and skills required for attaini	ng at least most of the	
_			and shills assumed for othersia		
C					
	knowledge to a range of	problems in geochemistry and how interactions a	mong minerals, fluids and gases	impact material fluxe	
_					
D					
Fail		tle or no evidence of command of knowledge ical and critical abilities, logical and coherent thin		g the course learnin	
		ics related to the geochemistry and the app		ity to apply knowledg	
	Organization and present	ational alcilla are minimally affective or inoffective	meation of these principles to		
		ational skills are minimally effective or ineffective			
	th laboratory compone	ent course		geological problems	
Activities				geological problems  No. of Hours	
Activities Lectures	•	ent course  Details		No. of Hours	
Activities Lectures Laborator	у	ent course		No. of Hours 24 24	
Activities Lectures Laborator Group wo	y rk	Details  Up to 24 hours		No. of Hours 24 24 24	
Activities Lectures Laborator Group wo Discussion	y rk n	ent course  Details		No. of Hours 24 24 24 24 24	
Activities Lectures Laborator Group wo Discussion Reading /	y rk	Details  Up to 24 hours  Up to 24 hours		No. of Hours 24 24 24 24 24 60	
Activities Lectures Laborator Group wo Discussion	y rk n	Details  Up to 24 hours	Weighting in final	No. of Hours 24 24 24 24 60 Assessment	
Activities Lectures Laborator Group wo Discussion Reading /	y rk n	Details  Up to 24 hours  Up to 24 hours		No. of Hours 24 24 24 24 60 Assessment Methods	
Activities Lectures Laborator Group wo Discussio Reading / Methods	y rk n Self study	Details  Up to 24 hours  Up to 24 hours  Details	Weighting in final course grade (%)	No. of Hours 24 24 24 60 Assessment Methods to CLO Mappine	
Activities Lectures Laborator Group wo Discussio Reading / Methods	y rk n Self study	Details  Up to 24 hours  Up to 24 hours	Weighting in final course grade (%)	No. of Hours 24 24 24 60 Assessment Methods to CLO Mapping CLO 1,2,3,4	
Activities Lectures Laborator Group wo Discussion Reading / Methods  Examinati Presentati	y rk n Self study	Details  Up to 24 hours  Up to 24 hours  Details	Weighting in final course grade (%)  60 20	No. of Hours 24 24 24 60 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4	
Activities Lectures Laborator Group wo Discussio Reading / Methods  Examinati Presentat Project re	y rk n Self study	Details  Up to 24 hours  Up to 24 hours  Details  One 2-hour written examination	Weighting in final course grade (%)	No. of Hours 24 24 24 60 Assessment Methods to CLO Mapping CLO 1,2,3,4	
Activities Lectures Laborator Group wo Discussio Reading / Methods  Examinati Presentat Project re	y rk n Self study	Details  Up to 24 hours  Up to 24 hours  Details	Weighting in final course grade (%)  60 20	No. of Hours 24 24 24 60 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4	
	2. Zircon U 3. Principle 4. Introduce 5. Principle On succes CLO 1 de CLO 2 ex CLO 3 un CLO 4 un sc Pass in EA	Zircon U-Pb isotopic dating al 3. Principles and techniques for 4. Introduction to Quaternary ge 5. Principle, development and a On successful completion of this CLO 1 demonstrate knowledge CLO 2 explain principles of radi CLO 3 understand how modern CLO 4 understand how geochesciences  Pass in EASC2401 or EASC240  N Offer in 2018 - 2019: N  A Student demonstrates the learning outcomes. Show ability to apply his/her knowledge in geochemist fluxes of materials over organizat-ional and prese organizat-ional and prese ange of problems in geominerals, fluids and gase organizational and preser C Student demonstrates guerning outcomes. Show knowledge to a range of on a global scale. Student demonstrates paoutcomes. Show evidence ability to understand key Student shows the ability Student shows the ability	CLO 2 explain principles of radiogenic isotopic dating CLO 3 understand how modern analytical techniques are applied to di CLO 4 understand how geochemical methods are applied to gain insi sciences  Pass in EASC2401 or EASC2406 or EASC2407  N Offer in 2018 - 2019 : N  A Student demonstrates thorough mastery at an advanced level of extensive learning outcomes. Shows strong analytical and critical abilities and logical ability to apply his/her knowledge to a wide range of problems in geock knowledge in geochemistry to understand the interactions among mineral fluxes of materials over geological time periods and on a global scale organizat-ional and presentational skills.  B Student demonstrates substantial command of a broad range of knowledge minerals, fluids and gases over geological time periods and on a glob organizational and presentational skills.  C Student demonstrates general but incomplete command of knowledge learning outcomes. Show evidence of some analytical and critical ability knowledge to a range of problems in geochemistry and how interactions a on a global scale. Student shows the ability to apply moderately effective organizational wability to understand key topics in geochemistry and limited capability Student shows the ability to apply limited or barely effective organizational	<ul> <li>2. Zircon U-Pb isotopic dating and its application</li> <li>3. Principles and techniques for dating mineral deposits</li> <li>4. Introduction to Quaternary geochronology</li> <li>5. Principle, development and applications of Luminescence dating</li> <li>On successful completion of this course, students should be able to:</li> <li>CLO 1 demonstrate knowledge of concepts and ideas of modern geochemistry</li> <li>CLO 2 explain principles of radiogenic isotopic dating</li> <li>CLO 3 understand how modern analytical techniques are applied to dating earth materials</li> <li>CLO 4 understand how geochemical methods are applied to gain insight into process in enviror sciences</li> <li>Pass in EASC2401 or EASC2406 or EASC2407</li> <li>N Offer in 2018 - 2019 : N</li> <li>Examination</li> <li>A Student demonstrates thorough mastery at an advanced level of extensive knowledge and skills required learning outcomes. Shows strong analytical and critical abilities and logical thinking, with evidence of ori ability to apply his/her knowledge to a wide range of problems in geochemistry, and at the same, can knowledge in geochemistry to understand the interactions among minerals, fluids and gases and how th fluxes of materials over geological time periods and on a global scale. Student shows the ability to organizat-ional and presentational skills.</li> <li>B Student demonstrates substantial command of a broad range of knowledge and skills required for attaining course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and apply range of problems in geochemistry, and at the same combine knowledge in geochemistry to understand minerals, fluids and gases over geological time periods and on a global scale. Student shows the ability to apply moderately effective organizational and presentational skills.</li> <li>C Student demonstrates general but incomplete command of knowledge and skills required for attaining learning outco</li></ul>	

EASC3417	Earth through time (6 credits)	Academic Year	2017

Offering Department	Earth Sc	iences		Quota		
Course Co-ordinator	Dr S C C	hang, Earth Sciences (	(suchin@hku.hk)			
Teachers Involved	`	McKenzie,Earth Scienc Chang,Earth Sciences)	/			
Course Objectives	fossil rec	ord and the integration	of Earth Systems and	geological principles. To provide ar plate tectonics. To gain an apprecia d life on Earth through time.		
Course Contents & Topics	such as		Cambrian explosion of	ation of life through time, Important of ife, the Permian/Triassic mass extin		
Course Learning			s course, students shou	ld be able to:		
Outcomes		define basic geological	•			
		explain critical geologic	•			
			e development of our p			
			record of evolution thro	•		
				forward to explain major events in Ea	rth history	
		describe major fossil g	roups			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	EASC3403				
Offer in 2017 - 2018		t sem Offer in 2018 -		Examination		
Grade Descriptors (A+ to F)	Α	to draw appropriate and laboratory classes; show language and correct res	insightful conclusions. Appl ring strong ability in experim ults.	thinking, with evidence of original thought. Cri y highly effective organizational and presente ents, data processing and analysis; presentin	tional skills. Attend all the g lab reports with accurate	
	B Evidence of analytical and critical abilities and logical thinking. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. Attend all the laboratory classes; showing ability in experiments, data processing and analysis; presenting lab reports with correct results.					
	С	Evidence of some analytical and critical abilities and logical thinking. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. Attend most of the laboratory classes; showing ability in experiments, data processing and analysis; presenting lab reports with mostly correct results.				
	D	Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Attend >50% of the laboratory classes; showing ability in experiments, data processing and analysis; presenting lab reports with acceptable results.				
	Fail	to draw appropriate conc	lusions. Organization and pre	es, logical and coherent thinking. Misuse of dat sentational skills are minimally effective or inel properly use computer and software for data p	fective. Miss more than ha	
Course Type	Lecture v	vith laboratory compon-	ent course			
Course Teaching	Activitie	s	Details		No. of Hours	
Learning Activities	Lectures	}			24	
	Laborato	ory				
	Project v	vork				
	Reading	/ Self study			90	
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		20	CLO 1,2,3,4,5,6	
	Examina			40	CLO 1,2,3,4,5,6	
	Project r	eport		10	CLO 1,2,3,4,5,6	
	Test			30	CLO 2,4,5	
Required/recommended reading and online materials	Stanley,	S. M and Luczaj, J. A.:	Earth System History (	th Edition)		

EASC3418	Earth s	urface processes (6 credits)	Academic Year	2017			
Offering Department	Earth Sc	iences	Quota				
Course Co-ordinator	TBC, Ea	rth Sciences ()					
Teachers Involved		V					
Course Objectives		rse will educate students on the integrative tectonic, climatic, and andscape and surface environment.	biogeochemical proc	esses that shape			
Course Contents & Topics	weatheri	phology; surface deformation; landscape evolution; erosional prong; low-temperature geochemistry as it pertains to surface processentrogen, phosphorus cycling).					
Course Learning	On succe	essful completion of this course, students should be able to:					
Outcomes	CLO 1	Describe the tectonic geomorphological processes that shape land	dscapes				
	CLO 2						
	CLO 3	CLO 3 Demonstrate knowledge of weathering processes and relationship to climate					
	CLO 4						
	CLO 5	CLO 5 Apply methods and proxies for Earth surface process studies					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	EASC2401 and EASC2402					
Offer in 2017 - 2018	N O	ffer in 2018 - 2019 : N	Examination				
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinkin to apply knowledge to a wide range of complex, familiar and unfamiliar situations.	ng, with evidence of origina				
	В	Demonstrate substantial command of a broad range of knowledge and skills re learning outcomes. Show evidence of analytical and critical abilities and logical th and some unfamiliar situations.					

	С	outcomes. Show evidence familiar situations.	of some analytical and critical a	edge and skills required for attaining mos abilities and logical thinking, and ability to	apply knowledge to most
	D		nerent and logical thinking, but w	d skills required for attaining some of the c vith limited analytical and critical abilities. Sh	
	Fail			e and skills required for attaining the course ig. Show very little or no ability to apply known	
Course Type	Lecture w	ith laboratory componen	t course		
Course Teaching	Activities	3	Details		No. of Hours
& Learning Activities	Lectures		12 lectures @2 hours each		24
	Laboratory		6 labs @2 hours each		12
	Field work		1 day		8
	Reading	/ Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examinat	ion		60	CLO 1,2,3,4,5
	Laborator	ry reports	Labs & Field work	40	CLO 1,2,3,4,5
Required/recommended reading and online materials		R. S. Anderson & S. e. University Press, 2010	•	ology: The Mechanics and Chemi	istry of Landscapes,

EASC3999	Directed	d studies in earth	sciences (6 credits)	Academic Ye	<b>ar</b> 2017	
Offering Department	Earth Scient	ences	· · · · · · · · · · · · · · · · · · ·	Quota		
Course Co-ordinator	Prof M Su	un, Earth Sciences (m	ninsun@hku.hk)			
Teachers Involved	(Various t	teachers in the Depar	tment,Earth Sciences)			
Course Objectives	To enhar thinking s		owledge of a particular topic and	the student's self-directed le	earning and critica	
Course Contents & Topics	The topic review or	is preferably one no a synthesis of publ	managed study on a topic in earth so t sufficiently covered in the regular ished work on the subject, or a la subject. The project may not require	curriculum. The directed stuboratory or field study that	idy can be a critica	
Course Learning	On succe	ssful completion of th	nis course, students should be able t	0:		
Outcomes	re	esearch in earth scien		• · · · · · · · · · · · · · · · · · · ·	doing independent	
	CLO 2 w	rite scientific disserta	tion, and conduct oral presentation	of the research results		
Pre-requisites (and Co-requisites and Impermissible combinations)	System S Cumulativ This cour Earth Sys	science Majors; and we GPA of 2.5 or abovese is not a capstone stem Science and Ge	course and students cannot use this	s course to fulfill the capston	0,	
Offer in 2017 - 2018		ar long Offer in 201	,	Examination	No Exam	
Grade Descriptors (A+ to F)	A	original thought. Insight to quote/reference aptly	grasp of the subject. Show strong analytica ful use and critical analysis / evaluation of information of control of the contr	ormation drawn from a full range of ghtful conclusions and solve problen	high quality sources and ns. Apply highly effective	
	В	relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions to draw insightful conclusions and solve problems. Apply effective organizational and presentational skills.				
	C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D	logical thinking, but with through summary rathe Apply limited or barely e	limited grasp, with retention of some relevar himited analytical and critical abilities. Den r than analysis and comparison. Limited abi effective organizational and presentational sk	nonstrate use and reference of sev- ity to use data and results to draw lls.	eral sources, but mainly appropriate conclusions	
	Fail	analytical and critical a	of little or no grasp of the knowledge and bilities, logical and coherent thinking. Limite and results and/or unable to draw appropri effective.	ed use of secondary sources and r	o critical comparison of	
Course Type	Project-ba	ased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Reading	/ Self study	The student is expected to sp the project	end at least 120 hours on	120	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Research	n report	Report and presentation	100	CLO 1,2	

EASC4403	Biogeochemical cycles (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Dr Y Li, Earth Sciences (yiliang@hku.hk)		
Teachers Involved	(Dr Y Li,Earth Sciences)		
Course Objectives	This course presents how the basic geochemistries of the Earth system, from at hydrosphere, have been and are being affected by the origin, evolution and exparticular, from the rapid consumption of resources to the destruction of the rain are leading to rapid changes in the geochemistry of the Earth systems.	istence of life. Hi	iman activities in
Course Contents	1) Origin of elements, the Solar system and the Earth		

& Topics	3) Terres 4) Aquati 5) Marine 6) Phosp 7) Sulfur 8) Carbo 9) Nitrog 10) Bioge	strial biogeochemical c ic biogeochemical cycle e biogeochemical cycle shorous cycle cycle n cycle en cycle eochemical cycles and	es es impacts from human activitie	s		
Course Learning			is course, students should be	able to:		
Outcomes			chemical cycles on Earth			
				ycles and the main environments		
	b	oiogeochemical cycles	,	tems and the cause/effect relation	iships of changes to	
			ogenic activities become a sig	initicant part of globe change		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	EASC3403 or EASC34	16 or ENVS3313			
Offer in 2017 - 2018	Y 1s	t sem Offer in 2018 -	- 2019 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical activities and logical thinking.					
(11-101)	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcome. Show evidence of analytical and critical abilities and logical thinking.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Apply moderately effective organizational and presentational skills. Show interest in the taught topics, and to answer most questions correctly.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. She limited ability to apply knowledge to solve problems. Show some interest in the taught topics. Able to answer more than half of question correctly.				
	Fail	of analytical and critica		and skills required for attaining the course king. Show very little or no ability to ap e to answer most of questions.		
Course Type	Lecture-b	pased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Lectures	3			28	
	Tutorials	3			10	
	Field wo	rk			8	
	Group w	ork	PBL group work		10	
	Project v		Writing course thesis		30	
		/ Self study			54	
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Essay			60	CLO 1,2,3,4	
	Examina	ation		40	CLO 1,2,3,4	
Required/recommended reading and online materials			s of Global Change, William Fochemistry, Susan M. Libes, E	d. Schlesinger, Emily Bernhardt. Elsevier, 2009.		

EASC4406	Earth dynamics & global tectonics (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Prof G Zhao, Earth Sciences (gzhao@hku.hk)		
Teachers Involved	(Prof G Zhao, Earth Sciences)		
Course Objectives	To review the concepts and processes that shape the configuration of the Earth This course is intended to provide students with an understanding of the driving global outcome of these processes through an examination of direct and indihypotheses, and critical thinking.	forces of Earth p	rocesses and the
Course Contents & Topics	<ul> <li>Earth as a heat engine; Earth's interior; major features of the continents and or</li> <li>Plate tectonics; orogenesis; crustal growth.</li> <li>Mantle convection; hot spots and plumes;</li> <li>Energy and driving forces of Earth processes;</li> <li>Methods of investigation of large scale structures and processes;</li> <li>Structure and physical properties of the planet;</li> <li>Isostasy; continental drift;</li> <li>Sea floor spreading; ocean ridges; transform faults;</li> <li>Subduction zones; mountain belts and orogenesis;</li> <li>Formation of continental crust;</li> <li>Continental rifts and continental margins;</li> <li>Sedimentary basins;</li> <li>Mechanism, consequence and implication of plate tectonics.</li> </ul>	ceans;	
Course Learning Outcomes  Pre-requisites (and Co-requisites	On successful completion of this course, students should be able to: CLO 1 have an appreciation of the Earth as a dynamic planet CLO 2 understand how energy release within the Earth is translated into geological appreciate the importance of a knowledge of the history of investigation CLO 4 distill of a wide range of data to differentiate competing geological theorical produce concise written and oral summaries of literature research on sp Pass in EASC3403 or EASC3404 or EASC3408 or EASC3409	of global scale tec es	
and Impermissible combinations) Offer in 2017 - 2018	Y 2nd sem Offer in 2018 - 2019 : Y	Examination	May

Grade Descriptors (A+ to F)	A	in-depth grasp of the subject Show outstanding and effect	thorough mastery of the knowledge and skil t, and provide evidence of strong analytical titve organizational and presentation skills, h level of critical analysis and draw appro les, and evidence.	and logical thinking, where poss and the insightful use of data, lite	sible with original thought. erature reviews and other
	В	course outcomes, and have organizational and presenta	substantial knowledge of a significant range a substantial grasp of the subject. Show ev tional skills and make critical use of relevar en consequent interpretations. Be capable	ridence of the ability to think critic at information from different source	cally and to have effective ces, showing the ability to
	С	course outcomes, and a ger effective organizational and appropriate conclusions, sh	general command of the knowledge, compe neral grasp of the subject. Show some evid d presentational skills. The student shoul hould be able to use relevant information bugh partial integration of theories, principle:	lence of critical ability and logica d be moderately effective in the from sources and able to make	I thinking and moderately ne use of data to draw
	D	number of the course learni critical thinking and at leas	partial but limited command of the knowl ng outcomes, and a limited grasp of the su t marginally effective organizational and p conclusions and use and reference a va	bject. Show evidence of some a resentational skills. Have limited	nalytical competence and diability to use data and
	Fail	outcomes, lacks an overall little ability to a apply knowled	no evidence of knowledge and skills reg grasp of the subject area and shows an a edge to solve problems and has poor and in tion of theories, principles and evidence.	bsence of analytical and critical	thinking abilities. Shows
	Lecture-ba	ased course			
Course Teaching	Activities	i	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials		student seminars and exercises		12
	Reading /	Self study	essay, presentation plus additiona	al reading	100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	nts		10	CLO 1,2,3,4,5
	Essay		Including essays and seminars	40	CLO 1,2,3,4,5
	Examinati	on	<u> </u>	50	CLO 1,2,3,4,5
Required/recommended	Kearey. P	and Vine, F.J. Global te	ectonics (Oxford: Blackwell Science	, 1996, 2nd ed.)	
		and Schubert, G. Geo	•		

EASC4407	Region	al geology (6 cred	dits)	Academic Yea	r 2017
Offering Department	Earth Sci	iences		Quota	40
Course Co-ordinator	Dr A A G	Webb, Earth Science	es (aagwebb@hku.hk)		
Teachers Involved	Dr J R A	G Webb,Earth Scienc Ali,Earth Sciences)	,		
Course Objectives	geologica	al questions.	al geologies as well as the appl		_
Course Contents & Topics	can test various of of East A America,	models for the evolutional slimate-tectonic interactions and the progress NE China). Students	complete with original figures on a complete with a complete series of the complete series of the complete series of the complete series of the complete with original figures on the complete with original figures.	stems. Likely case studies incl es, Himalaya), the complex intr c core complexes via low-angle hesize and communicate geolo	ude exploration of raplate deformation e normal faults (N gical knowledge by
Course Learning	On succe	essful completion of the	his course, students should be able	e to:	
Outcomes		ppreciate the influent egional tectonic phen	tial (and commonly conflicting) mod nomena	lels that have been proposed to	explain a range of
	ti	he evolution of tecton	us "tools" that are commonly used nically complicated regions		
	fi	indings via visual and	scientific literature review on a k I written communication in an enga		
Pre-requisites (and Co-requisites	Pass in E	EASC3402; and (EAS	C3403 or EASC3404)		
and Impermissible					
and Impermissible combinations)	Y 1s	t sem Offer in 2018	3 - 2019 : Y	Examination	No Exam
and Impermissible combinations) Offer in 2017 - 2018	Y 1s	Thorough grasp of the	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation	ties and logical thinking; highly effect	ive organizational and
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors		Thorough grasp of the presentational skills; in and to quote/reference Substantial grasp of the skills; critical use of respectively.	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation	ties and logical thinking; highly effect n of information drawn from a full range d logical thinking; effective organizatio	ive organizational and of high quality sources
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Α	Thorough grasp of the presentational skills; in and to quote/reference Substantial grasp of the skills; critical use of resecondary interpretation General but incomple organizational and presentational and presentational control of the presentation of the presentati	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation aptly. he subject; evidence of critical abilities an elevant information from sources, showing	ties and logical thinking; highly effect n of information drawn from a full range d logical thinking; effective organizatio g ability to make meaningful comparis the critical abilities and logical thinking	ive organizational and of high quality sources and and presentational sons between different g; moderately effective
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	В	Thorough grasp of the presentational skills; in and to quote/reference Substantial grasp of the skills; critical use of resecondary interpretation General but incompler organizational and predifferent interpretations. Limited grasp of the subarely effective organization and the than analysis and the subarely effective organization and subar	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation aptly.  he subject; evidence of critical abilities an elevant information from sources, showing ons and to quote/reference aptly. te grasp of the subject; evidence of som sentational skills; use of relevant informations and to quote/reference aptly. Ubject, retention of some relevant informations izational and presentational skills; use and d comparison.	ties and logical thinking; highly effect n of information drawn from a full range d logical thinking; effective organization g ability to make meaningful comparisure critical abilities and logical thinking in from sources, showing ability to make on of the subject; evidence of limited critical reference of several sources, but make	ive organizational and of high quality sources and and presentational sons between different g; moderately effective e comparisons between ditical abilities; limited or ainly through summary
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	A B C	Thorough grasp of the presentational skills; in and to quote/reference Substantial grasp of the skills; critical use of resecondary interpretation General but incomple organizational and predifferent interpretations Limited grasp of the subarely effective organi rather than analysis an Little or no grasp of the	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation aptly. he subject; evidence of critical abilities an elevant information from sources, showing one and to quote/reference aptly. te grasp of the subject; evidence of som sentational skills; use of relevant informations and to quote/reference aptly. ubject, retention of some relevant informatic izational and presentational skills; use and	ties and logical thinking; highly effect n of information drawn from a full range d logical thinking; effective organization g ability to make meaningful comparis ne critical abilities and logical thinking in from sources, showing ability to make on of the subject; evidence of limited critical reference of several sources, but make ct; little or no evidence of critical abilitie	ive organizational and of high quality sources and and presentational sons between different g; moderately effective e comparisons between ditical abilities; limited or ainly through summary as and logical / coherents
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	A B C D Fail	Thorough grasp of the presentational skills; in and to quote/reference. Substantial grasp of the skills; critical use of resecondary interpretations. Ceneral but incomple organizational and predifferent interpretations. Limited grasp of the subarely effective organizather than analysis an Little or no grasp of the thinking; incoherent or	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation aptly. he subject; evidence of critical abilities an elevant information from sources, showing many and to quote/reference aptly. It grasp of the subject; evidence of som sentational skills; use of relevant informations and to quote/reference aptly. Ubject, retention of some relevant informatic izational and presentational skills; use and dicomparison.	ties and logical thinking; highly effect n of information drawn from a full range d logical thinking; effective organization g ability to make meaningful comparis ne critical abilities and logical thinking in from sources, showing ability to make on of the subject; evidence of limited critical reference of several sources, but make ct; little or no evidence of critical abilitie	ive organizational and of high quality sources and and presentational sons between different g; moderately effective e comparisons between ditical abilities; limited or ainly through summary as and logical / coherents
and Impermissible combinations)  Offer in 2017 - 2018  Grade Descriptors (A+ to F)  Course Type  Course Teaching	A B C D Fail	Thorough grasp of the presentational skills; in and to quote/reference Substantial grasp of the skills; critical use of resecondary interpretation. General but incomple organizational and predifferent interpretations. Limited grasp of the subarely effective organizational and the thinking; incoherent or them.	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation aptly. he subject; evidence of critical abilities an elevant information from sources, showing many and to quote/reference aptly. It grasp of the subject; evidence of som sentational skills; use of relevant informations and to quote/reference aptly. Ubject, retention of some relevant informatic izational and presentational skills; use and dicomparison.	ties and logical thinking; highly effect n of information drawn from a full range d logical thinking; effective organization g ability to make meaningful comparis ne critical abilities and logical thinking in from sources, showing ability to make on of the subject; evidence of limited critical reference of several sources, but make ct; little or no evidence of critical abilitie	ive organizational and of high quality sources and and presentational sons between different g; moderately effective e comparisons between ditical abilities; limited or ainly through summary as and logical / coherents
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail	Thorough grasp of the presentational skills; in and to quote/reference Substantial grasp of the skills; critical use of resecondary interpretation General but incomple organizational and predifferent interpretations. Limited grasp of the subarely effective organizational and predifferent interpretations are used to the subarely effective organization or org	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation aptly. he subject; evidence of critical abilities an elevant information from sources, showing many and to quote/reference aptly. It grasp of the subject; evidence of som sentational skills; use of relevant informatios and to quote/reference aptly. Ubject, retention of some relevant informatic izational and presentational skills; use and comparison. It is kills; use and ganization and poor presentational skills; list panization and poor presentational skills; list ponent course	ties and logical thinking; highly effect n of information drawn from a full range d logical thinking; effective organization g ability to make meaningful comparis ne critical abilities and logical thinking in from sources, showing ability to make on of the subject; evidence of limited critical reference of several sources, but make ct; little or no evidence of critical abilitie	ive organizational and of high quality sources and and presentational sons between different g; moderately effective e comparisons between ditical abilities; limited or ainly through summary as and logical / coherent or critical comparison of
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail Lecture v Activitie	Thorough grasp of the presentational skills; in and to quote/reference Substantial grasp of the skills; critical use of resecondary interpretation General but incomple organizational and predifferent interpretations. Limited grasp of the subarely effective organizational and predifferent interpretations are used to the secondary of the subarely effective organization or organge of the thinking; incoherent or them.	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation aptly. he subject; evidence of critical abilities an elevant information from sources, showing many and to quote/reference aptly. It grasp of the subject; evidence of som sentational skills; use of relevant informatios and to quote/reference aptly. Ubject, retention of some relevant informatic izational and presentational skills; use and comparison. It is kills; use and ganization and poor presentational skills; list panization and poor presentational skills; list ponent course	ties and logical thinking; highly effect not information drawn from a full range di logical thinking; effective organization grability to make meaningful comparisure critical abilities and logical thinking in from sources, showing ability to make the office of the subject; evidence of limited critical reference of several sources, but make the critical abilities are reference of several sources, but make the critical abilities are critical abilities.	ive organizational and of high quality sources and and presentational sons between different g; moderately effective e comparisons between ditical abilities; limited or ainly through summary as and logical / coherent o critical comparison of No. of Hours
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	B C D Fail Lecture v Activitie Lectures Laborato	Thorough grasp of the presentational skills; in and to quote/reference Substantial grasp of the skills; critical use of resecondary interpretation General but incomple organizational and predifferent interpretations. Limited grasp of the subarely effective organizational and predifferent interpretations are used to the secondary of the subarely effective organization or organge of the thinking; incoherent or them.	e subject; evidence of strong critical abili sightful use and critical analysis / evaluation aptly.  he subject; evidence of critical abilities an elevant information from sources, showing most and to quote/reference aptly.  te grasp of the subject; evidence of som sentational skills; use of relevant informations and to quote/reference aptly.  ubject, retention of some relevant informatic izational and presentational skills; use and comparison.  e knowledge and understanding of the subject ganization and poor presentational skills; lied tourse  Details	ties and logical thinking; highly effect not information drawn from a full range di logical thinking; effective organization grability to make meaningful comparisure critical abilities and logical thinking in from sources, showing ability to make the office of the subject; evidence of limited critical reference of several sources, but make the critical abilities are reference of several sources, but make the critical abilities are critical abilities.	ive organizational and of high quality sources and and presentational sons between different g; moderately effective e comparisons between ditical abilities; limited or ainly through summary as and logical / coherent o critical comparison of No. of Hours 28

EASC4408	Special	topics in earth scie	ences (6 credits)	Academic Ye	ear 2017		
Offering Department	Earth Scient			Quota	30		
Course Co-ordinator	Dr M H Le	ee, Earth Sciences (mhl	lee@hku.hk)				
eachers Involved							
Course Objectives	The overa universe, Students targeted f meteorites	Topic: Planetary system and Biogeochemistry The overall aim of this special topic is to develop an advanced understanding of our planet's place within the wider universe, the origins of our planetary system, and geological processes in extreme extraterrestrial environments. Students will explore the concept of abiotic chemical evolution and learn about various important biomarkers argeted for life detection in modern space exploration missions. The course also provides opportunities to study neteorites and their relationship to the origin of the Earth, solar system & universe, and survey planetary topics, nocluding impacts, differentiation, and volcanism on planetary objects.					
Course Contents & Topics	The cours 1. The int 2. Star for 3. Meteor 4. Impacts 5. Evolutio 6. Prebiot 7. Biosynt 8. Biomar 9. Symme 10. Mass 11. Plane	The course will cover the following aspects of planetary science. The following topics will be covered in lectures:  1. The interstellar medium  2. Star formation and the accretion of planets  3. Meteorites and comets  4. Impacts and craters  5. Evolution of other terrestrial planets  5. Prebiotic chemistry and the origins of life  7. Biosynthetic isotopic fractionations  8. Biomarker and molecular signatures  9. Symmetry-breaking mechanisms  10. Mass spectrometry for organic geochemists  11. Planetary mission concepts  12. Life detection on habitable planet and moons					
Course Learning		•	course, students should be able	to:			
Outcomes	CLO 1 identify various planetary materials in the Solar System and understand how they formed and every CLO 2 understand how planetary events shaped the history of the Earth and the structure of our solar structure of particular chemical structures as molecular fossils to interpret past life based on under of extant life  CLO 4 evaluate contemporary theories on the origin of life and the formation of complex organic most space and their delivery to planetary surfaces  CLO 5 use modern analytical techniques to reconstruct organic constituents in samples and intergenerated from the latest planetary missions						
	-		d curiosity in the field of planetary	science			
re-requisites		ny EASC3XXX or EASC					
and Co-requisites and Impermissible combinations)		•					
Offer in 2017 - 2018		fer in 2018 - 2019 : N		Examination			
Grade Descriptors (A+ to F)	B C	learning outcomes, and evide logical thinking, with evide familiar and unfamiliar situinsightful conclusions. Appi Demonstrate substantial celarning outcomes. Show knowledge to familiar and correct use of data, literat presentational skills. Demonstrate general but outcomes. Show evidence knowledge to most familiar sources to draw appropriat Demonstrate partial but lim Show evidence of some control of the state of the second control of	istery at an advanced level of extensive ridence of productive reading supplement ince of original thought, and ability to sy ations. Demonstrate critical use of data, ly highly effective organizational and presommand of a broad range of knowledge evidence of analytical and critical abilities some unfamiliar situations, but falling sure reviews, and other sources to draw incomplete command of knowledge and of some analytical and critical abilities situations. Demonstrate mostly correct it econclusions. Apply moderately effective inited command of knowledge and skills is coherent and logical thinking, but with liest the construction of the conference of the conclusions.	ting lectures. Show strong analytica nthesize and apply knowledge to a iterature reviews, and other sources entational skills.  and skills required for attaining at es and logical thinking, and ability thort on excellence in some of the appropriate conclusions. Apply effect of the strength of the strength of the strength of the content of the conten	all and critical abilities and wide range of complex is to draw appropriate and least most of the course to synthesize and apply see aspects. Demonstrate ective organizational and to fithe course learning to synthesize and apply trature reviews, and othe skills.  Show limited ability to		
	Fail	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to synthesize and apply knowledge to solve problems. Demonstrate misuse of data, literature reviews, and other sources and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.					
Course Type		ith laboratory compone					
ourse Teaching	Activities		Details		No. of Hours		
Learning Activities	Lectures		12 sessions x 2 hours	24			
	Laborato	•	6 sessions x 2 hours		12 15		
	Group wo	JIK	preparation + presentation 6 sessions x 2 hours		15		
		/ Self study	O SESSIOTIS X Z HOURS		60		
	Assessm	•			15		
ssessment Methods nd Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme			30	CLO 1,2,3,4,5,6		
	Presenta		group presentation	20	CLO 1,2,3,4,6		
		•	individual essay	50	CLO 1,2,3,4,6		
Required/recommended reading and online materials	Introduction Introduction How to but	U 11					

Enrichment:
There are enormous opportunities to read further on the subjects presented - just ask for details.

EASC4911	Earth sy	stem: contemporar	y issues (6 credits)		Academic Year	2017
Offering Department	Earth Scie		,		Quota	
Course Co-ordinator	Dr S C Ch	ang, Earth Sciences (su	ıchin@hku.hk)			
Teachers Involved	(Dr S C CI	hang,Earth Sciences)	•			
Course Objectives			ovides students with an	opportunity to synthe	esize and correla	ite the knowledge
	gained in	previous courses in Earl	th System Science for the	em to gain a more in-	-depth appreciation	on and awareness
			between its component			Students will also
	get some	basic concepts on how t	o do strategic analysis or	global trends of nati	ural resources.	
Course Contents		as an integrated system				
& Topics		ctions between Earth's o				
		tion of Earth's global clin	•			
		as a fine-tuning system.				
		source and managemen zards and management				
		rces and Bioethics.	.5.			
		nd in oil and natural gas.				
		•	(non-metals, ferrous meta	als and rare earth ele	ments).	
Course Learning			ourse, students should be			
Outcomes		•	h the nature of the issues		ind as part of the	Earth System
			terrelationships through fe			
			available from a variety	•	•	
		rticularly in areas of con		,	.,,	p
		•	present activities on the p	lanet will affect its fu	ture	
Pre-requisites			anced level (level 3 or 4)			the Earth System
(and Co-requisites			vo of the following course			•
and Impermissible	This capst	one course is for Earth	System Science Major stu	udents only.		
combinations)	The earlie	st that a student is allow	ed to take this capstone	course is their year 3	study.	
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	019 : Y		Examination	No Exam
(A+ to F)	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to synthesize and apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate critical use of data, literature reviews, and other sources to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to synthesize and apply knowledge to familiar and some unfamiliar situations. Demonstrate correct use of data, literature reviews, and other sources to draw appropriate conclusions. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to synthesize and apply knowledge to most familiar situations. Demonstrate mostly correct but some erroneous use of data, literature reviews, and other sources to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.  D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to					
	synthesize and apply knowledge to solve problems. Demonstrate limited ability to use of data, literature reviews, and othe sources to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.					
	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to synthesize and apply knowledge to solve problems. Demonstrate misuse of data, literature reviews, and other sources and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.					
Course Type		sed course	1			
Course Teaching	Activities		Details			No. of Hours
& Learning Activities		vith supervisor				36
		Self study				80
	Assessme	ent				24
Assessment Methods and Weighting	Methods		Details		ting in final e grade (%)	Assessment Methods to CLO Mapping
	Oral prese	entation			60	CLO 1,2,3,4
	Research	report			40	CLO 1,2,3,4
Required/recommended reading and online materials	Diego, Ca	lifornia: Academic Press system. Lee R. Kump,	cochemical cycles to glob c, c2000. James F. Kasting, Robert	Ü	•	
		ne environment / G. Tyle CA : Brooks/Cole, c2012	er Miller, Jr., Scott E. Spoo	olman.		

EASC4955	Integrated field studies (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	35
Course Co-ordinator	Dr J A King, Earth Sciences (jessking@hku.hk)		
Teachers Involved	(Dr A A G Webb,Earth Sciences) (Dr J A King,Earth Sciences) (Dr R McKenzie,Earth Sciences)		
Course Objectives	The aims of a geological field camp activities are to provide:  1) essential training and experience in geological mapping techniques.  2) the opportunity to gain confidence in independently applying these skills to a complexity.  3) opportunities to study at first-hand areas of particular geological interest and in		

		· · · · · · · · · · · · · · · · · · ·	n of geological knowledge from multiple			
Course Contents & Topics	Students will visit areas of geological interest and will undertake independent and group mapping and problem solving exercises in each area. The curriculum comprised 3 x 6-day long projects (based on an ~2x5km area o interest), where each week long project is typically scheduled as follows:  Day 1-2: Instructor-lead learning.					
			g. //independent field mapping and site vis	it.		
	Day 6: Fi	eld examination.				
	Day 7: W	/rite up/Rest.				
			is required to produce:			
		section of the area. (5%	area. (15% x 3 = 45%) % x 3 = 15%)			
		•	ne students must prepare ONE report	(15%) - This field repor	t should include the	
	tectonic deposition	evolution of region, sy nal environments, mag	nthesized from the all three projects argmatic events and structural data.	` '		
		s field skills:	students, working INDEPENDENTLY	of other students and	faculty construct a	
	geologic one-day		ns in a small (~1km x ~1km) area that the			
Course Learning			is course, students should be able to:			
Outcomes		•	hy and petrogenesis of rocks and miner	als.		
	CLO 2 lo	dentify geological setti	ng from lithologies and stratigraphy.			
	CLO 3 N	Measure, record and a	nalyse structural data.			
			aps and cross-sections.			
	CLO 5 Synthesize varied geological information pertaining to an area in order to derive a basic model of tectonic evolution.					
			valuate areas of potential natural hazard	•		
Pre-requisites			dvanced level (level 3 or 4) disciplinary of			
(and Co-requisites and Impermissible			S in, or student must be already enrolle	u III EASC3403, EASC3	404 OF EASC3409.	
combinations)			ology Major students only. lowed to take this capstone course is th	eir vear 3 etudy		
Offer in 2017 - 2018					No Evam	
Grade Descriptors	Y 2nd sem Offer in 2018 - 2019 : Y Examination No Exam  A Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of					
(A+ to F)		original thought. Apply highly fieldwork skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.				
	D					
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Field can					
Course Teaching	Activitie	·	Details		No. of Hours	
& Learning Activities	Lectures	}	18 sessions x 1 hour		18	
-	Field wo		18 field days x 5 hours/day		90	
		/ Self study			72	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents	Area Maps & Cross-sections (3 x 20% each	60	CLO 1,2,3,4	
	Report		1 Final Report (15%) + 10% for professional conduct	25	CLO 1,2,3,4,5,6	
	Test		3 Field Test (5% each)	15	CLO 1,2,3,4	
Additional Course Information	courses	underway during the	e right to withdraw any students with semester (semester 2) prior to leavir m examination result or laboratory perfo	ng for field camp (May		

EASC4966	Earth sciences internship (6 credits)	Academic Year	2017
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Dr X R Zuo, Earth Sciences (xuranzuo@hku.hk)		
Teachers Involved	(Dr J Wong,Earth Sciences) (Dr X R Zuo,Earth Sciences)		
Course Objectives	This course aims to offer students the opportunities to gain work experient study. The workplace learning experience would be of great benefits to gained in the study to the real work environments. Students have to take either within the University or outside the University arranged by the Scho	o the students to apply e on at least 160 hours o	their knowledge
Course Contents & Topics	<ol> <li>(1) Within the university: The student will be supervised by a staff memiorarious tasks as instructed by the Supervisor.</li> <li>(2) Outside the university: The student will work in an external agency rewill be supervised under a staff member of the external agency (the External Department/School of the student (the Internal Supervisor). The work to be instructed by the External Supervisor, with prior agreement of the Internal</li> </ol>	elated to the major of st rnal Supervisor) and a sta be performed by the stu	tudy. The student aff member of the
Course Learning	On successful completion of this course, students should be able to:		

Outcomes	CLO 1 g	ain at least 4 weeks of	work experience in a geosciences-re	elated firm or the Governm	nent		
	CLO 2 acquire an understanding and appreciation of the real work environment						
	CLO 3 h	ave some experience	with applying learned knowledge to s	olving real world problems	S		
Pre-requisites (and Co-requisites and Impermissible combinations)	System So This cours Earth Syst	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth Paystem Science Majors.  This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors.  The earliest that a student is allowed to take this course is their year 3 study.					
Offer in 2017 - 2018	Y 1st	sem 2nd sem Sum	mer Offer in 2018 - 2019 : Y	Examination	No Exam		
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by supervisor(s). the job. Successfully fulfills and evaluation by supervisof "Distinction".	solve problems in the workplace. Successful Establishes effective collaboration and comr it the requirements set out in the Course Dessor(s), etc. Students demonstrating excellent	nunication with supervisor(s), or cription regarding working hours performance in the above wou	olleagues, and clients in written and oral report, ald be awarded a grade		
		Fail  Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or assigned by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.					
Course Type	Internship						
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Internship	work	it is expected that students are to work at least 160 hours (or the equivalent of 4 weeks full-time)		160		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Written report		written report, employer's feedback and oral presentation	100	CLO 1,2,3		
Additional Course Information	contact the Enrolment	e Department to obtain of this course is not co	n "Pass/Fail" basis. Students who a the approval. onducted via the online course selec e after approval has been obtained fr	tion system and should b	e made through the		

	Earth	sciences project	(12 credits)	Academic Year	r 2017		
Offering Department	Earth So		•	Quota			
Course Co-ordinator	Prof M S	Sun, Earth Sciences	(minsun@hku.hk)	'			
Teachers Involved	(Various	s teachers in the Dep	partment,Earth Sciences)				
Course Objectives	To enha	To enhance the student's knowledge, ability and interest in advanced studies in the Earth Sciences by providing					
•	the stud	the student with an opportunity to be engaged in an advanced research project.					
Course Contents			esearch project in the form of a senior th		of a staff membe		
& Topics	by the s	The project could be based on a particular component of a staff member's research or one proposed and designed by the student. The student must involve in the project in a non-trivial manner, and play a major role in the project formulation, data collection and analysis, and presentation. The project should contain an element of originality.					
Course Learning	On succ	cessful completion of	this course, students should be able to:				
Outcomes		•	research experience in earth sciences the supervision of a supervisor	by doing an individual	research project		
		critical thinking .	ics, design research path, choose rese	<b></b>			
			n doing independent earth/environmental				
Pre-requisites (and Co-requisites and Impermissible combinations)	System Cumula This cou Earth Sy	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth System Science Majors; and Cumulative GPA of 2.7 or above.  This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors.  The earliest that a student is allowed to take this course is their year 3 study.					
Offer in 2017 - 2018		ear long Offer in 2	,	Examination	No Exam		
Grade Descriptors	A		gh grasp of the subject. Show strong analytical an				
(A+ to F)		to quote/reference a highly effective organ	phtful use and critical analysis / evaluation of inform ptly. Critical use of first-hand data and results to nizational and presentational skills. [Work of A+ sh equired in wider areas relevant to the topic.]	draw insightful conclusions and	solve problems. Apply		
	С	relevant information and to quote/referent conclusions and solv Demonstrate genera Use of relevant inforquote/reference aptly	ntial grasp of the subject. Evidence of analytical a from sources, showing ability to make meaningful nce aptly. Correct use of first-hand data of res e problems. Apply effective organizational and pres l but incomplete grasp of the subject. Evidence of ormation from sources, showing ability to make Mostly correct but some erroneous use of first-	comparisons between different sec ilts to draw appropriate conclusional sentational skills. some analytical and critical abilities comparisons between different i	condary interpretations ons to draw insightfu s and creative thinking interpretations and to		
		relevant information and to quote/referer conclusions and solv Demonstrate genera Use of relevant info quote/reference aptly Apply moderately eff	ntial grasp of the subject. Evidence of analytical a from sources, showing ability to make meaningful nce aptly. Correct use of first-hand data of resu e problems. Apply effective organizational and prest but incomplete grasp of the subject. Evidence of somation from sources, showing ability to make y. Mostly correct but some erroneous use of first- ective organizational and presentational skills.	comparisons between different sec ilts to draw appropriate conclusion sentational skills. some analytical and critical abilities comparisons between different in hand data and results to draw ap	condary interpretations ons to draw insightfu s and creative thinking interpretations and to propriate conclusions		
	С	relevant information and to quote/referer conclusions and solv Demonstrate genera Use of relevant info quote/reference apply Apply moderately eff Demonstrate partial logical thinking, but through summary ra	ntial grasp of the subject. Evidence of analytical a from sources, showing ability to make meaningful nce aptly. Correct use of first-hand data of res e problems. Apply effective organizational and pres l but incomplete grasp of the subject. Evidence of ormation from sources, showing ability to make Mostly correct but some erroneous use of first-	comparisons between different sec ills to draw appropriate conclusions inentational skills. some analytical and critical abilities comparisons between different in hand data and results to draw ap formation, of the subject. Evidence strate use and reference of sever to use first-hand data and resulf	condary interpretation ons to draw insightfus and creative thinking interpretations and to propriate conclusions of some coherent an al sources, but mainl		
	С	relevant information and to quote/referer conclusions and solv Demonstrate genera Use of relevant info quote/reference apth Apply moderately eff Demonstrate partial I logical thinking, but through summary ra conclusions. Apply lin Demonstrate eviden analytical and critica	ntial grasp of the subject. Evidence of analytical a from sources, showing ability to make meaningful nee aptly. Correct use of first-hand data of resu e problems. Apply effective organizational and prese I but incomplete grasp of the subject. Evidence of somation from sources, showing ability to make y. Mostly correct but some erroneous use of first-ective organizational and presentational skills. Dut limited grasp, with retention of some relevant in with limited analytical and critical abilities. Demon ther than analysis and comparison. Limited ability mited or barely effective organizational and present ce of little or no grasp of the knowledge and un I abilities, logical and coherent thinking. Limited uhand data and results and/or unable to draw appro	comparisons between different sec- ills to draw appropriate conclusic ientational skills.  some analytical and critical abilities comparisons between different i hand data and results to draw ap- formation, of the subject. Evidence strate use and reference of sever- to use first-hand data and result ational skills.  derstanding of the subject. Evide ise of secondary sources and no	condary interpretations to draw insightfus and creative thinking interpretations and to propriate conclusions of some coherent and all sources, but mainly to draw appropriate to draw appropriate conclusions.		
Course Type	C D	relevant information and to quote/referer conclusions and solv Demonstrate genera Use of relevant info quote/reference apthy Apply moderately eff Demonstrate partial logical thinking, but through summary raconclusions. Apply lin Demonstrate eviden analytical and criticathem. Misuse of first-	ntial grasp of the subject. Evidence of analytical a from sources, showing ability to make meaningful nee aptly. Correct use of first-hand data of resu e problems. Apply effective organizational and prese I but incomplete grasp of the subject. Evidence of somation from sources, showing ability to make y. Mostly correct but some erroneous use of first-ective organizational and presentational skills. Dut limited grasp, with retention of some relevant in with limited analytical and critical abilities. Demon ther than analysis and comparison. Limited ability mited or barely effective organizational and present ce of little or no grasp of the knowledge and un I abilities, logical and coherent thinking. Limited uhand data and results and/or unable to draw appro	comparisons between different sec- ills to draw appropriate conclusic ientational skills.  some analytical and critical abilities comparisons between different i hand data and results to draw ap- formation, of the subject. Evidence strate use and reference of sever- to use first-hand data and result ational skills.  derstanding of the subject. Evide ise of secondary sources and no	condary interpretation ons to draw insightfus and creative thinking interpretations and to propriate conclusions of some coherent an al sources, but mainly ts to draw appropriate once of little or lack of critical comparison of		
	C D	relevant information and to quote/referer conclusions and solv Demonstrate genera Use of relevant info quote/reference apth Apply moderately eff Demonstrate partial logical thinking, but through summary ra conclusions. Apply lin Demonstrate eviden analytical and critica them. Misuse of first are minimally effectives.	ntial grasp of the subject. Evidence of analytical a from sources, showing ability to make meaningful nee aptly. Correct use of first-hand data of resu e problems. Apply effective organizational and prese I but incomplete grasp of the subject. Evidence of somation from sources, showing ability to make y. Mostly correct but some erroneous use of first-ective organizational and presentational skills. Dut limited grasp, with retention of some relevant in with limited analytical and critical abilities. Demon ther than analysis and comparison. Limited ability mited or barely effective organizational and present ce of little or no grasp of the knowledge and un I abilities, logical and coherent thinking. Limited uhand data and results and/or unable to draw appro	comparisons between different sec- ills to draw appropriate conclusic ientational skills.  some analytical and critical abilities comparisons between different i hand data and results to draw ap- formation, of the subject. Evidence strate use and reference of sever- to use first-hand data and result ational skills.  derstanding of the subject. Evide ise of secondary sources and no	condary interpretation ones to draw insightfus and creative thinking interpretations and to appropriate conclusions of some coherent an all sources, but mainlist to draw appropriate critical comparison of critical comparison of critical comparison of the draw appropriate of the of the draw a		
Course Teaching	C D Fail Project- Activiti	relevant information and to quote/referer conclusions and solv Demonstrate genera Use of relevant info quote/reference apth Apply moderately eff Demonstrate partial logical thinking, but through summary ra conclusions. Apply lin Demonstrate eviden analytical and critica them. Misuse of first are minimally effectives.	ntial grasp of the subject. Evidence of analytical a from sources, showing ability to make meaningful nece aptly. Correct use of first-hand data of resue problems. Apply effective organizational and prest but incomplete grasp of the subject. Evidence of sormation from sources, showing ability to make / Mostly correct but some erroneous use of first-ective organizational and presentational skills. Dut limited grasp, with retention of some relevant in with limited analytical and critical abilities. Demonther than analysis and comparison. Limited ability mited or barely effective organizational and present ce of little or no grasp of the knowledge and unit abilities, logical and coherent thinking. Limited the hand data and results and/or unable to draw approve or ineffective.	comparisons between different sec ilts to draw appropriate conclusion sentational skills.  some analytical and critical abilities comparisons between different in hand data and results to draw appersonal of the subject. Evidence strate use and reference of sever of to use first-hand data and resultational skills.  derstanding of the subject. Evidence is secondary sources and no priate conclusions. Organization a	condary interpretation ones to draw insightfus and creative thinking interpretations and to propriate conclusions of some coherent an al sources, but mainl ts to draw appropriate coritical comparison of ond presentational skill		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	C D Fail Project- Activiti	relevant information and to quote/referer conclusions and solv Demonstrate genera Use of relevant info quote/reference apth Apply moderately eff Demonstrate partial logical thinking, but through summary raconclusions. Apply lin Demonstrate eviden analytical and criticathem. Misuse of first are minimally effectives based course	ntial grasp of the subject. Evidence of analytical as from sources, showing ability to make meaningful noce aptly. Correct use of first-hand data of resule problems. Apply effective organizational and presel but incomplete grasp of the subject. Evidence of somation from sources, showing ability to make y. Mostly correct but some erroneous use of first-ective organizational and presentational skills. Sout limited grasp, with retention of some relevant in with limited analytical and critical abilities. Demon ther than analysis and comparison. Limited abilities than analysis and comparison. Limited abilities of little or no grasp of the knowledge and unit abilities, logical and coherent thinking. Limited ushand data and results and/or unable to draw approve or ineffective.    Details   The student is expected to spend	comparisons between different sec ilts to draw appropriate conclusion sentational skills.  some analytical and critical abilities comparisons between different in hand data and results to draw appersonal of the subject. Evidence strate use and reference of sever of to use first-hand data and resultational skills.  derstanding of the subject. Evidence is secondary sources and no priate conclusions. Organization a	condary interpretations to draw insightful and creative thinking interpretations and to appropriate conclusions of some coherent and at sources, but mainly sto draw appropriate conclusions of some coherent and sources, but mainly sto draw appropriate nace of little or lack of critical comparison on digresentational skill No. of Hours		

ENVS1401	Introduc	tion to environmenta	I science (6 credits)	Academic Year	2017		
Offering Department	Earth Scie	ences		Quota			
Course Co-ordinator	Dr C A No	t, Earth Sciences (cnot@h	ıku.hk)				
Teachers Involved	(Dr C A No	ot,Earth Sciences)					
Course Objectives	interconne To convey and depen To better	To provide students with an inter-disciplinary introduction to Environmental Science highlighting the interconnections between biological, geological, and chemical processes. To convey the basic science behind environmental interactions and place it within the context of human impact and dependence on the natural world. To better understand how humans interact, manage, and sustain the environment within the context of outconomies, governments and individual choices.					
Course Contents & Topics	Part I: The science co problems ( Part II: Us assuring a Part III: GI	The teaching and learning will be organized around key issues, and loosely divided into three sections. Part 1: The basics: application of science to solve environmental problems; key ecological, chemical, and earth science concepts essential to environmental science, understanding the underlying causes of environmental problems (human population growth and economics). Part II: Using and conserving our resources: how we use and misuse key natural resources; the difficulty in assuring a sustainable supply of energy; waste management and air pollution issues. Part III: Global issues: How do our actions change the face of the planet? Urban ecology and understanding our contribution to global climate change.					
Course Learning	On succes	ssful completion of this cou	irse, students should be ab	le to:			
Outcomes	CLO 1 Ex	plain and describe connec	ctions between the physical	and biological components of the	environment.		
	CLO 2 Dis	scuss the impacts of huma	an activities on the environn	nent.			
	CLO 3 Explain the concept of environmental sustainability and give examples of how society can adapt behavior to achieve sustainability.						
		nderstand how we are ove oblems presented in class.	0	compare different approaches to	resolving specific		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2019	9 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough unders complex, familiar and unfamilia on time and to a high academic	s to a wide range of coursework complete				
	В	Demonstrate a good understanding of the subject and an ability to apply knowledge to familiar and some unfamiliar situations Show evidence of logical thinking abilities. Coursework completed on time and to a good academic standard.					
	C Demonstrate general but incomplete understanding of the subject and an ability to apply knowledge to most familiar situations. Show some evidence of logical thinking, but with some inconsistencies. Some coursework incomplete, but submitted on time and in an adequate academic standard.						
	D	·					
	Fail	no evidence of logical or cohere	standing of the subject and very li ent thinking. Coursework missing	ttle or no ability to apply knowledge to far or substandard.	niliar situations. Shov		
Course Type		ased course					
Course Teaching	Activities	<u> </u>	)etails		No. of Hours		
& Learning Activities	Lectures				24		
	Tutorials		group discussion/case studies		24		
	Field work		two half day field trips		10		
	Reading /	Self study			112		
Assessment Methods and Weighting	Methods		<b>Details</b>	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		50	CLO 1,2,3,4		
	Examinati			35	CLO 1,2,3,4		
	Test		guizzes	15	CLO 1,2,3,4		
Required/recommended reading and online materials	Miller: Livir	ng in the Environment (The	·		,,=,0,1		

ENVS3004	Environment, society and economics (6 credits)  Academic Year   2017						
Offering Department	Earth Sciences	Quota					
Course Co-ordinator	Prof Y Q Zong, Earth Sciences (yqzong@hku.hk)						
Teachers Involved	(Prof Y Q Zong, Earth Sciences)						
Course Objectives	This course follows up issues highlighted in the introductory course and provides in-depth studies about rural and urban environments for students to examine the problems of resource scarcity and pollutant accumulation in the natural environment, which are the problems human society is currently confronted. The course will focus on major environmental problems and explore how Environmental Economics can be applied for resource management and environmental restoration/protection. Students will analyze the nature of key natural resources such as land, air, water and biomass, and explore ways to improve resource management, protect the environment and develop sustainable economies.						
Course Contents & Topics	Valuing the environment Basic concepts of Environmental Economics Resourse management for land, air, water and biomass Management of waste Energy policies and economics Planning and regulations for a sustainable future						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 demonstrate knowledge and critical understanding of the complexity and interconnectedness between human society and the natural environment  CLO 2 recognise appropriate use and misuse of natural resources						
	CLO 3 assess economic solutions and policies for solving environmental proble	ms					

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in o	one of the following course	es: CHEM2041, EASC2404	4, ENVS2001 or ENVS2002		
Offer in 2017 - 2018	Y 1s	t sem Offer in 2018 - 20	)19 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery of the course material. Show strong ability for analytical, critical and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate highly effective organizational and presentational skills.				
	В	Demonstrate substantial command of the course material and an ability to apply knowledge to familiar and some unfamiliar situations. Show evidence of analytical, critical thought to some complex issues. Apply effective organizational and presentational skills.				
	С			rrse material and an ability to apply kno hinking abilities. Apply moderately effec		
	D	Demonstrate partial but limited command of the course material and a limited ability to apply knowledge to solve problems. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply limited or barely effective organizational and presentational skills.				
	Fail			material with very little or no ability to an nking. Organization and presentational skil		
Course Type	Lecture-b	pased course				
Course Teaching	Activitie	es .	Details No. of Hour			
& Learning Activities	Lectures	<b>;</b>	12 sessions of 2 hrs	24		
	Group work				12	
	Project work				12	
	Discussi	on			12	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		30	CLO 3	
	Examina	ation		40	CLO 1,2	
	Project r	eports		30	CLO 1,2,3	
Required/recommended reading and online materials	Keller an Kaufman	Tielenberg and Lewis: Environmental economics and policy  Keller and Botkin: Essential Environmental Science (John Wiley & Sons, 2008)  Kaufmann and Cleveland: Environmental Science (Amazon, 2008)  Middleton N.: The Global Casino: An Introduction to Environmental Issues (Arnold, 1999)				
Additional Course Information		course code: ENVS2004 ory to 4-year students		, ,		

ENVS3007	Natura	I hazards and m	itigation (6 cr	edits)		Acader	nic Year	2017
Offering Department	Earth So	ciences				Quota		
Course Co-ordinator	Prof P P	C Wu, Earth Scien	ces (ppwu@hku.	hk)				
Teachers Involved								
Course Objectives	landslide natural, protection	This course introduces students the mechanisms of major natural hazards including earthquake, storm and flood, landslide and tsunami. The teaching emphasizes the fundamental concepts: natural hazards are not entirely natural, and understanding the frequency and processes of these hazards is essential in developing prevention, protection and mitigation measures. With case studies, the course will help students explore the political, economical and engineering means of dealing with natural hazards.						
Course Contents & Topics	Key cha Geologic Climatic Prepare Risk ass	Key characteristics of natural hazards Geological hazards and mitigation measures Climatic hazards and mitigation measures Preparedness and responses to large natural disasters Risk assessment and disaster management Financial (insurance) instruments for economic recovery						
Course Learning	On succ	essful completion o	f this course, stu	dents should be	able to:			
Outcomes	CLO 1	demonstrate knowle	edge and critical	understanding o	of the key o			ural hazards, the
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	EASC2404 or ENVS	S2001 or ENVS2	002				
Offer in 2017 2010	N Offer in 2018 - 2019 : Y Examination							
Offer in 2017 - 2018 Grade Descriptors (A+ to F)	11	/IICI III 20 IO - 20 IO .	Y			Examir	nation	
Grade Descriptors	A	Demonstrate thorou evidence of original Demonstrate highly	gh mastery of the thought, and ability effective organization	to apply knowledged and presentation	ge to a wide al skills.	pility for analytical, c range of complex, fa	ritical and imiliar and	unfamiliar situations.
Grade Descriptors	В	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substa situations. Show e presentational skills.	gh mastery of the thought, and ability effective organization intial command of the vidence of analytic	to apply knowledge nal and presentation ne course material a al, critical thought	ge to a wide al skills. and an ability to some co	bility for analytical, c range of complex, fa to apply knowledge amplex issues. Appl	ritical and imiliar and to familiar y effective	unfamiliar situations. and some unfamiliar organizational and
Grade Descriptors	A	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substa situations. Show e presentational skills. Demonstrate genera	gh mastery of the thought, and ability effective organization intial command of the vidence of analytical but incomplete or	to apply knowledge nal and presentation ne course material al, critical thought command of the cou	ge to a wide al skills. and an ability to some course material	collity for analytical, corange of complex, fa	ritical and amiliar and to familiar y effective ply knowled	unfamiliar situations.  and some unfamiliar organizational and  dge to most familiar
Grade Descriptors	В	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substastituations. Show e presentational skills. Demonstrate generistuations. Show e presentational skills. Demonstrate partial	gh mastery of the thought, and ability effective organization intial command of the vidence of analytical but incomplete covidence of some could be the command of the comm	to apply knowledge all and presentation are course material all, critical thought command of the couritical and logical of the course mate	ge to a wide al skills.  and an ability to some course material thinking abiliti rial and a limit	bility for analytical, c range of complex, fa to apply knowledge emplex issues. Appl and an ability to ap	ritical and imiliar and to familiar y effective ply knowled by effective owledge to so	unfamiliar situations. and some unfamiliar organizational and dge to most familiar organizational and solve problems. Show
Grade Descriptors	A B C	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substa situations. Show e presentational skills. Demonstrate generituations. Show e presentational skills. Demonstrate partial evidence of some c organizational and p Demonstrate little of the state of the s	gh mastery of the thought, and ability effective organization intial command of the vidence of analytic all but incomplete covidence of some command but limited command object at logical tresentational skills. In no evidence of common of the command of the command object at limited command the command of the co	to apply knowledge all and presentation are course material all, critical thought oritical and logical for the course mate hinking, but with liming ammand of course	ge to a wide al skills. and an ability to some course material thinking abiliti rial and a limit hited analytica material with	bility for analytical, c range of complex, fa to apply knowledge implex issues. Appl and an ability to ap- ies. Apply moderate ed ability to apply knowledge.	ritical and amiliar and to familiar and to familiar y effective ply knowled by effective pulsed to see Apply limit to apply to apply to apply to apply the second to a	unfamiliar situations. and some unfamiliar organizational and dge to most familiar organizational and solve problems. Show ed or barely effective knowledge to solve
Grade Descriptors (A+ to F)	A B C D	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substasituations. Show e presentational skills. Demonstrate generisituations. Show e presentational skills. Demonstrate partial evidence of some corganizational and p Demonstrate little or problems. Lack of ci	gh mastery of the thought, and ability effective organization intial command of the vidence of analytic all but incomplete covidence of some command but limited command object at logical tresentational skills. In no evidence of common of the command of the command object at limited command the command of the co	to apply knowledge all and presentation are course material all, critical thought oritical and logical for the course mate hinking, but with liming ammand of course	ge to a wide al skills. and an ability to some course material thinking abiliti rial and a limit hited analytica material with	bility for analytical, c range of complex, fa to apply knowledge implex issues. Appl and an ability to ap- ies. Apply moderate ed ability to apply kno I and critical abilities. very little or no abili	ritical and amiliar and to familiar and to familiar y effective ply knowled by effective pulsed to see Apply limit to apply to apply to apply to apply the second to a	unfamiliar situations. and some unfamiliar organizational and dge to most familiar organizational and solve problems. Show ed or barely effective knowledge to solve
Grade Descriptors (A+ to F)  Course Type	A B C D	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substasituations. Show e presentational skills. Demonstrate generatiuations. Show e presentational skills. Demonstrate partial evidence of some corganizational and p Demonstrate little o problems. Lack of cor ineffective.	gh mastery of the thought, and ability effective organization intial command of the vidence of analytic all but incomplete covidence of some command but limited command object at logical tresentational skills. In no evidence of common of the command of the command object at limited command the command of the co	to apply knowledge all and presentation are course material all, critical thought oritical and logical for the course mate hinking, but with liming ammand of course	ge to a wide al skills. and an ability to some course material thinking abiliti rial and a limit hited analytica material with	bility for analytical, c range of complex, fa to apply knowledge implex issues. Appl and an ability to ap- ies. Apply moderate ed ability to apply kno I and critical abilities. very little or no abili	ritical and amiliar and to familiar and to familiar y effective ply knowled by effective pulsed to see Apply limit to apply to apply to apply to apply the second to a	unfamiliar situations. and some unfamiliar organizational and dge to most familiar organizational and solve problems. Show ed or barely effective knowledge to solve
Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substasituations. Show e presentational skills. Demonstrate generatiuations. Show e presentational skills. Demonstrate partial evidence of some corganizational and p Demonstrate little o problems. Lack of cor ineffective.	gh mastery of the thought, and ability effective organization intial command of the vidence of analytical but incomplete covidence of some covidence of some cobut limited command oberent and logical tresentational skills. In the covidence of covidence	to apply knowledge all and presentation are course material all, critical thought oritical and logical for the course mate hinking, but with liming ammand of course	ge to a wide al skills. and an ability to some course material thinking abiliti rial and a limit hited analytica material with	bility for analytical, c range of complex, fa to apply knowledge implex issues. Appl and an ability to ap- ies. Apply moderate ed ability to apply kno I and critical abilities. very little or no abili	ritical and amiliar and to familiar and to familiar y effective ply knowled by effective pulsed to see Apply limit to apply to apply to apply to apply the second to a	unfamiliar situations. and some unfamiliar organizational and dge to most familiar organizational and solve problems. Shov ed or barely effective knowledge to solve ire minimally effective
Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail Lecture- Activiti	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substasituations. Show e presentational skills. Demonstrate generatituations. Show e presentational skills. Demonstrate partial evidence of some corganizational and p Demonstrate little oproblems. Lack of cor ineffective.	gh mastery of the thought, and ability effective organization intial command of the vidence of analytical but incomplete covidence of some covidence of some cobut limited command oberent and logical tresentational skills. In the covidence of covidence	to apply knowledgual and presentation to course material al, critical thought ommand of the couritical and logical of the course material and logical of the course material, but with liming the course and incoherent this	ge to a wide al skills. and an ability to some course material thinking abiliti rial and a limit hited analytica material with	bility for analytical, c range of complex, fa to apply knowledge implex issues. Appl and an ability to ap- ies. Apply moderate ed ability to apply kno I and critical abilities. very little or no abili	ritical and amiliar and to familiar and to familiar y effective ply knowled by effective pulsed to see the pulsed by the pulsed	unfamiliar situations. and some unfamiliar organizational and dge to most familiar organizational and solve problems. Show ed or barely effective knowledge to solve are minimally effective  No. of Hours
Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail Lecture- Activiti Lecture	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substasituations. Show e presentational skills. Demonstrate generatituations. Show e presentational skills. Demonstrate partial evidence of some corganizational and p Demonstrate little oproblems. Lack of cor ineffective.  based course  S S	gh mastery of the thought, and ability effective organization intial command of the vidence of analytical but incomplete conditions of the condition of the con	to apply knowledgual and presentation be course material al, critical thought ommand of the countrical and logical of the course material and logical of the course materials, but with liminary but with liminary and incoherent this attorials	ge to a wide al skills. and an ability to some course material thinking abiliti rial and a limit hited analytica material with	bility for analytical, c range of complex, fa to apply knowledge implex issues. Appl and an ability to ap- ies. Apply moderate ed ability to apply kno I and critical abilities. very little or no abili	ritical and amiliar and to familiar and to familiar y effective ply knowled by effective pulsed to see the pulsed by the pulsed	unfamiliar situations.  and some unfamiliar organizational and dge to most familiar organizational and solve problems. Showed or barely effective knowledge to solve re minimally effective.  No. of Hours 24
Grade Descriptors	A B C D Fail Lecture- Activiti Lecture Tutorial Discuss	Demonstrate thorou evidence of original Demonstrate highly Demonstrate substasituations. Show e presentational skills. Demonstrate generatituations. Show e presentational skills. Demonstrate partial evidence of some corganizational and p Demonstrate little oproblems. Lack of cor ineffective.  based course  S S	gh mastery of the thought, and ability effective organization intial command of the vidence of analytic all but incomplete or vidence of some control of the vidence of control of vidence of control of the vidence of control of vidence of control of vidence of	to apply knowledgual and presentation be course material al, critical thought ommand of the countrical and logical of the course material and logical of the course materials, but with liminary but with liminary and incoherent this attorials	ge to a wide al skills. and an ability to some course material thinking abiliti rial and a limit hited analytica material with	bility for analytical, c range of complex, fa to apply knowledge implex issues. Appl and an ability to ap- ies. Apply moderate ed ability to apply kno I and critical abilities. very little or no abili	ritical and amiliar and to familiar and to familiar y effective ply knowled by effective pulsed to see the pulsed by the pulsed	unfamiliar situations. and some unfamiliar organizational and dge to most familiar organizational and solve problems. Showed or barely effective knowledge to solve re minimally effective  No. of Hours 24 8

and Weighting			course grade (%)	Methods to CLO Mapping		
	Examination		50	CLO 1		
	Project reports		50	CLO 1		
Required/recommended reading and online materials	Smith K.: Environmental Hazards: Assessing Risk and Reducing Disaster (Routledge, 2004) Bryant E.: Natural Hazards (Cambridge University Press, 2005) Hyndman and Hyndman: Natural Hazards and Diasters (Amazon, 2009)					
Additional Course Information	Previous course code: ENVS2007					

ENVS3042	Pollution	n (6 credits)		Academic Ye	<b>ar</b> 2017	
Offering Department	Earth Scie	nces		Quota	50	
Course Co-ordinator	Dr B Thibo	deau, Earth Sciences	(bthib@hku.hk)			
Teachers Involved	(Dr B Thib	odeau,Earth Sciences)				
Course Objectives	This multi-disciplinary course will introduce students to the most important physical, chemical and biological contaminants that pollute the environment. The course will provide the basics of contaminant transport, toxicology, pollution monitoring and environmental risk assessment. The course will also explore in details different mechanisms and pathways for water, atmosphere, soil and land pollution. The student will also be invited to reflect on the socio-economic aspect of pollution and remediation.  Overview of Global Pollution					
Course Contents & Topics	Physical, Chemical and Biological Contaminants Contaminants Transport Processes Environmental Toxicology Water Pollution Atmospheric Pollution Soil and Land Pollution Monitoring and Risk Assessment Strategy The Future Pollution					
Course Learning	On succes	sful completion of this	course, students should be able to	):		
Outcomes	CLO 1 id	dentify the most import	ant pollutants			
	CLO 2	lescribe the mechanisr	ms responsible for the transport of	pollutants in the environmer	nt	
	CLO 3	evaluate the environme	ntal toxicity of different type of con	tamination		
	CLO 4	present the most import	tant cases of environmental pollution	on		
	CLO 5	analyze lab-generated	data and communicate the results	and interpretations		
Pre-requisites (and Co-requisites and Impermissible combinations)			1 or BIOL2103 or ENVS2001	-	N. F.	
Offer in 2017 - 2018		sem Offer in 2018 - 2		Examination	No Exam	
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence original thought. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effect organizational and presentational skills.  B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Correct use of of results to draw appropriate conclusions. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical think Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effect organizational and presentational skills.  D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent logical thinking, but with limited analytical and critical abilities. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lace analytical and critical abilities, logical and coherent thinking. Misuse of data and results and/or unable to draw appropriate conclusions.					
O	14	•	and presentational skills are minimally effect	ctive or ineffective.		
Course Type	_	th laboratory compone			N = = £ ! !	
Course Teaching & Learning Activities	Activities		Details	No. of Hours		
a Leanning Activities	Lectures	.,			30 24	
	Laborator	•				
A		Self study			90	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		50	CLO 1,2,3,4,5	
	Test		Midterm (20%) Final (30%)	50	CLO 1,2,3,4,5	
Required/recommended reading and online materials			ence, Second Edition, 2006 es P. Gerba (Author), Mark L. Bruss	seau (Author)	·	
Additional Course Information	This class	contains theoretical ar	nd case study-based laboratories			

ENVS3313	Environmental oceanography (6 credits) Academic Year 201					
Offering Department	Earth Sciences Quota					
Course Co-ordinator	Dr C A Not, Earth Sciences (cnot@hku.hk)					
Teachers Involved	(Dr C A Not,Earth Sciences)					
Course Objectives	To provide students with a thorough introduction to coastal and ocean processes with key questions to highlight the importance of the (paleo)oceanographic processes to environmental and ecological conditions.  To convey the basic science behind ocean-atmosphere and ocean-biosphere interactions and place it within the context of human's connectedness and impact to the physical world.					
Course Contents & Topics	To provide a solid foundation of knowledge about the physical processes di their impacts on the environment and ecosystems. The oceans take up 71% o the water. By looking at the structure of the atmosphere, thermodynamic prin water, we will evaluate the critical roles the ocean plays in the environment	f earth's surface ar cipals and properti	nd contain 98% of es governing sea			

Course Learning		. , ,	rise, El Nino, and (paleo)climate will be used to connect oceanographic principles to environmental problems.  On successful completion of this course, students should be able to:  CLO 1 describe the major surface and deep currents of the ocean						
Outcomes		•							
	CLO 2 id		nportant processes in the ocean		ulation and nutrient				
	CLO 3 d	escribe sources and dis	stribution of critical chemicals and	d sea water properties in the c	cean				
			tween physical ocean processes						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	Pass in BIOL2306 or EASC2404 or ENVS2001 or ENVS2002							
Offer in 2017 - 2018	Y 2nd	d sem Offer in 2018 -	2019 : Y	Examination	May				
Grade Descriptors (A+ to F)	A	learning outcomes. Show	astery at an advanced level of extensive ability to think logically and critically, we and insightful conclusions. Apply highly	rith evidence of original thought. Cri	tically evaluate data and				
	В	learning outcomes. Show	command of a broad range of knowledg v evidence of logical and critical thoug results to draw appropriate conclusions.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some logical and critical thinking. Apply moderately effective organizational and presentational skills. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.								
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited critical abilities. Apply limited or barely effective organizational and presentational skills. Limited ability to use data and results to draw appropriate conclusions.								
	Pail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of critical, logical and/or coherent thinking. Organization and presentational skills are minimally effective or ineffective. Misuse of data and results and/or unable to draw appropriate conclusions.								
Course Type	Lecture w	vith laboratory compone	ent course						
Course Teaching	Activitie	· <del>-</del>	Details		No. of Hours				
& Learning Activities	Lectures	;	12 sessions x 2 hours		24				
	Laborato	,	10 labs x 2 hours		20				
	Field wor		1 day field trip		8				
	Project w		group project		12 90				
	Reading / Self study								
					A				
	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
			Details		Methods				
	Methods	ients	Details  2 hour written final exam	course grade (%)  50 30	Methods to CLO Mapping				
	Methods	ients		course grade (%)	Methods to CLO Mapping CLO 1,2,3,4				
Assessment Methods and Weighting Required/recommended reading and online materials	Methods  Assignment Examination Test Garrison,	nents ation , 2004. Oceanography:	2 hour written final exam	course grade (%)  50 30 20  5th edition. Brooks Cole.	Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3				

ENVS3999	Directe	d studies in en	vironmental science (	6 credits)	Academic Year	2017	
Offering Department	Earth Sci				Quota		
Course Co-ordinator	Dr Z H Li	u, Earth Sciences	(zhliu@hku.hk)				
Teachers Involved	(Various	teachers in the De	partment,Earth Sciences)				
Course Objectives		ice students know al thinking skills.	ledge on a particular topic	in environmental science	and students self	-directed learning	
Course Contents & Topics	material		sive reading on a selected.  Students are required to written form.				
Course Learning	On succe	ssful completion o	f this course, students sho	uld be able to:			
Outcomes	CLO 1	complete a resea	rch task independently in o	ne or more topical areas	of the major		
	CLO 2	show competence	e in formulating their own s	cientific argument			
Pre-requisites (and Co-requisites and Impermissible combinations)	Science I Cumulati This caps	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major.  Cumulative GPA of 2.5 or above in Environmental Science Major.  This capstone course is for Environmental Science Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2017 - 2018		d sem Offer in 20	•	,	Examination	No Exam	
Grade Descriptors (A+ to F)	A Demonstrates excellent understanding of the topic, excellent development of argument, logical analysis and insight into the topic, with evidence of original thought. Insightful use and critical analysis of information drawn from a full range of high quality sources to draw appropriate and insightful conclusions. Presented in high academic standard. Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.						
	В	· · · · · · · · · · · · · · · · · · ·					
	C Demonstrate general but incomplete grasp of the chosen topic. Most aspects of the chosen topic were addressed and researched at a very basic level. Mostly correct but some erroneous use of relevant information from sources, demonstrates mainly description, and shows basic understanding, but lacking depth.						
	Demonstrate partial but limited grasp of the chosen topic, with retention of some relevant information. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited to draw appropriate conclusions from the sources.						
	Fail  Show little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Project-b	ased course		· ·			
Course Teaching	Activitie	s	Details			No. of Hours	
& Learning Activities	Reading	/ Self study	research work & re	port		120	
Assessment Methods	Methods	- }	Details	Weial	nting in final	Assessment	

and Weighting		course grade (%)	Methods to CLO Mapping
	Oral presentation	10	CLO 1,2
	Research report	90	CLO 1,2

ENVS4955	Environ	Environmental science in practice (6 credits)  Academic Ye					
Offering Department	Earth Scie			Quota	10		
Course Co-ordinator	Dr M Yası	uhara, Biological Sc	iences (yasuhara@hku.hk)	· ·			
Teachers Involved	(Dr M Yas	suhara,Biological Sc	ciences)				
Course Objectives		•	ntial learning experience in the field of ential studies covering essential areas		. ,		
Course Contents & Topics	residential sampling, geology/pa	Students to attend a residential field trip outside Hong Kong to learn about environmental science in practice. The residential field trip will be, for example, to Japan and may include marine environmental survey, sediment core sampling, practical learning of ecological, paleoecology and environmental problems, environmental geology/paleontology excursion, and other activities. Students are required to write an independent report on the learning outcome of the field trip.					
Course Learning			this course, students should be able to	:			
Outcomes	CLO 1		of environmental science in practice				
	CLO 2		of current environmental problems and	solutions			
	CLO 3	present and com	municate their field observations and fi	ndings			
Pre-requisites (and Co-requisites and Impermissible combinations)	Science M This capst	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major.  This capstone course is for Environmental Science Major students only.  The earliest that a student is allowed to take this course is their year 3 study					
Offer in 2017 - 2018		sem Offer in 201		Examination	No Exam		
Grade Descriptors (A+ to F)	A	Demonstrate thorough original thought. Apply	n grasp of the subject. Show strong analytical y highly effective lab / fieldwork skills and techn ons. Apply highly effective organizational and pr	and critical abilities and logical thin iques. Critical use of data and resu	nking, with evidence of		
	В	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective lab / fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab / fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective lab / fieldwork skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab / fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Laborator	y and workshop cou					
Course Teaching	Activities	•	Details		No. of Hours		
& Learning Activities	Field worl		Field work and other learning st least 66 hours of field trips and of	•	66		
	Reading /	Self study					
Assessment Methods and Weighting					100		
	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Methods  Laborator		Details field reports		Assessment Methods		
		ry reports	field reports	course grade (%)	Assessment Methods to CLO Mapping		
	Laborator	ry reports tion		course grade (%)	Assessment Methods to CLO Mapping CLO 1,2,3		
	Laborator Presentat Project re http://www	y reports tion eports v.biosch.hku.hk/eco	field reports group presentations individual report	30 30 40	Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3		
and Weighting	Laborator Presentat Project re http://www Enrollmen quota set. mail to Dr this is 2nd not be ac interested future aca academic The select other factor	ry reports tion ports v.biosch.hku.hk/eco tt Procedure: The a So, interested stuc . Moriaki Yasuhara I semester course, I cepted. The proportion joining this cou idemic/career path; details; (2) ID phote tion will be made b ors. Only accepted sential field trip will b	field reports group presentations individual report	course grade (%)  30 30 40  d and will vary year by year hort proposal (2 pages maxin (gylo@hku.hk) not later that ce, on or before this date). Let the specific reason(s)/motivities from this course, especifiests. The CV should include see taken and grades receive justification of academic mess will be able to register this ents will need to pay for their	Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 T, regardless of the mum) and CV via e the 1st August (Note: ate applications will ation why you are ally regarding your strict (1) Personal and ed. herit, in considering s course.		

ENVS4966	Environmental science internship (6 credits)	Academic Year	2017		
Offering Department	Earth Sciences	Quota			
Course Co-ordinator	Dr C Dingle, Biological Sciences (cdingle@hku.hk)				
Teachers Involved	(Dr C Dingle,Biological Sciences) (Dr C Not,Earth Sciences)				
Course Objectives	This course offers students the opportunity to gain work experience related to their major of study. This work experience will allow the students to apply their knowledge gained in their studies to the real environmental issues.				
Course Contents & Topics	Students will be supervised by a staff member (the Internal Supervisor) withi instructed by the Internal Supervisor. In the case of the work being carried out be supervised by a staff member of the external agency (the External Supervisor). The work to be performed by students	in an external age rvisor) and a staf	ncy, students will f member of the		

	External S	xternal Supervisor, with prior agreement of the Internal Supervisor.				
Course Learning	On succes	sful completion of this	course, students should be able to:			
Outcomes	CLO 1	ain at least 4 weeks of	work experience environmental-relat	ed firm or the Governmer	nt	
	CLO 2	, icquire an understandin	ng and appreciation of the real work e	environment		
	CLO 3 h	nave some experience v	with applying learned knowledge to s	olving real world problems	3	
Pre-requisites	Pass in a	t least 24 credits of ac	dvanced level (level 3 or 4) disciplin	nary core/elective course	s in Environmental	
(and Co-requisites	Science M	lajor.				
and Impermissible	This capst	This capstone course is for Environmental Science Major students only.				
combinations)	The earlie	st that a student is allov	ved to take this capstone course is the	eir year 3 study.		
Offer in 2017 - 2018	Y 1st	sem 2nd sem Sumr	mer Offer in 2018 - 2019 : Y	Examination	No Exam	
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by supervisor(s). the job. Successfully fulfills and evaluation by supervisof "Distinction".	solve problems in the workplace. Successfull Establishes effective collaboration and comm the requirements set out in the Course Desc sor(s), etc. Students demonstrating excellent	nunication with supervisor(s), contribution regarding working hours performance in the above wou	olleagues, and clients in written and oral report, ald be awarded a grade	
	Fail  Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or assigned by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.					
Course Type	Internship					
Course Teaching	Activities	i	Details		No. of Hours	
& Learning Activities	Internship work		it is expected that students are to work at least 160 hours (or the equivalent of 4 weeks full-time)		160	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Written report		written report, employer's feedback and oral presentation	100	CLO 1,2,3	
Course Website	http://moo	dle.hku.hk/				
Additional Course	No formal	lecture is to be given, b	out it is expected that students are to	work for at least 160 hou	rs (or the equivalent	
Information	Satisfactor be recorder interested Enrolment	No formal lecture is to be given, but it is expected that students are to work for at least 160 hours (or the equivalent of 4 weeks full-time), supervised by a staff member. Satisfactory completion of this course can be counted towards the Capstone requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on "Pass/Fail" basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Enrolment of this course is not conducted via the online course selection system and should be made through the elevant Department/School office after approval has been obtained from the course coordinator.				

ENVS4999	Environ	mental science proj	ect (12 credits)	Academic Ye	ar 2017			
Offering Department	Earth Scie	ences		Quota				
Course Co-ordinator	Dr Z H Liu	ı, Earth Sciences (zhliu@	)hku.hk)					
Teachers Involved	(Various t	eachers in the Departme	nt,Earth Sciences)					
Course Objectives	To enhan	ce students knowledge a	ind research skills in advanced le	evel of environmental science	<del>)</del> .			
Course Contents & Topics	member.	The project could be ba	oject in the form of an undergrad sed on one of the four areas co ertation should show an elemen	vered by the major and mus	st show elements of			
Course Learning	On succes	ssful completion of this c	ourse, students should be able to	<b>D</b> :				
Outcomes	CLO 1 c	omplete a dissertation pr	roject of undergraduate level in o	ne of the four areas of the m	ajor			
	CLO 2 s	how competence in form	ulation, data collection, analysis,	and presentation of a resea	rch project			
Pre-requisites (and Co-requisites and Impermissible combinations)	Science M Students This caps	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major; and Students must have a cumulative GPA of 3.0 or above in Environmental Science Major. This capstone course is for Environmental Science Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.						
Offer in 2017 - 2018		ar long Offer in 2018 - 2	•	Examination	No Exam			
Grade Descriptors (A+ to F)	A Demonstrates excellent understanding of the topic, excellent development of argument, logical analysis and insight into the topic, with evidence of original thought. Insightful use and critical analysis of information drawn from a full range of high quality sources to draw appropriate and insightful conclusions. Presented in high academic standard. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]							
	B Most aspects of the chosen topic were addressed and researched adequately. Demonstrates understanding of most key concepts, evidence of elementary analysis and development of argument. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations. Presented in adequate standard.							
	Demonstrate general but incomplete grasp of the chosen topic. Most aspects of the chosen topic were addressed and researched at a very basic level. Mostly correct but some erroneous use of relevant information from sources, demonstrates mainly description, and shows basic understanding, but lacking depth.							
	D Demonstrate partial but limited grasp of the chosen topic, with retention of some relevant information. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited to draw appropriate conclusions from the sources.							
	Fail  Show little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.							
Course Type	Project-ba	ised course						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Reading	Self study	research work & report		240			
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Dissertati	on		100	CLO 1,2			
Additional Course Information		course code: ENVS3015 rom major coordinator is	-					

MATH1009	Basic mathematics for business and economics (6 credits)  Academic Yea				ear 2017		
Offering Department	Mathemati	CS	·	Quota	380		
Course Co-ordinator	Dr Y M Ch	r Y M Chan (1st sem); Dr K H Law (2nd sem), Mathematics (ymchan@maths.hku.hk; lawkaho@maths.hku.hk)					
Teachers Involved	`	(Dr K H Law,Mathematics) (Dr Y M Chan,Mathematics)					
Course Objectives	Business application	This course aims at introducing important topics of mathematics for introductory or intermediate level courses in Business and Economics. Mathematical concepts and methods, as well as some Business and Economics applications, would be emphasized so that students could be furnished with the essential mathematical skills for the senior courses in these disciplines.					
Course Contents & Topics	3. Quadrat 4. Graphs 5. Different 6. Unconst 7. Partial d 8. Constrai 9. Integrati 10. Geome 11. Different 12. Different	Logic Linear Equations Quadratic Equations Graphs and Functions Differentiation Unconstrained optimization Partial differentiation Constrained optimization Integration J. Geometric series J. Difference equations (optional) J. Matrix algebra (optional)					
Course Learning		0 (1 /	course, students should be able to:				
Outcomes	CLO 1 de	monstrate knowledge a	and understanding of the essential material model and solve basic problems in				
			g with a higher level of mathematics				
Pre-requisites (and Co-requisites and Impermissible combinations)	The course Mathematic in these co This course	NIL The course has no pre-requisite, but students are expected to have already achieved Level 2 or above in HKDS Mathematics or equivalent. Not for students who have passed MATH1011 or MATH1013, or have already enrolle n these courses. This course is exclusively for non-Science and non-Engineering students (i.e. not for students from the Faculty of					
DEC. 1. 004E - 0040	Science or Engineering). Y 1st sem 2nd sem Offer in 2018 - 2019 : Y Examination Dec May						
Uπer in 2017 - 2018	Y 1st s	sem 2nd sem Offer	in 2018 - 2019 : Y	Examination	Dec May		
	A B C	Demonstrate an excellent u applications through correct and being able to carry out or Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable	inderstanding of key concepts and ideas by b thy analysing problems, clearly and eleganthy computations carefully and correctly, and with restanding of key concepts and ideas by bein thy analysing problems, but with some minor one and presentation or with some minor compu- te understanding of key concepts and ideas by	eing able to identify the appropresenting correct logical reas some innovative approaches ng able to identify the appropriate approaches in arguments, in utational errors.  y being able to correctly identifications are appropriate appropriate approaches.	opriate theorems and the coning and argumentatic to solving problems. oriate theorems and the dentifying the appropriat tify appropriate theorems		
Offer in 2017 - 2018 Grade Descriptors (A+ to F)	B C	Demonstrate an excellent u applications through correct and being able to carry out on Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of	inderstanding of key concepts and ideas by b thy analysing problems, clearly and elegantly computations carefully and correctly, and with restanding of key concepts and ideas by beir thy analysing problems, but with some minor ns and presentation or with some minor compresentation or key concepts and ideas by eunderstanding of key concepts and ideas by the sin applying the theorems through inco	eing able to identify the appropresenting correct logical reassome innovative approaches go able to identify the approprinadequacies in arguments, is utational errors.  y being able to correctly identification and analysing problems were proposed to the correctly analysing problems were presented to the correctly analysing problems were presented to the correctly analysing problems were presented to the correctly analysing problems.	opriate theorems and the soning and argumentation to solving problems. or or and the dentifying the appropriate theorems and the dentifying the appropriate theorems with poor argument and the solution of th		
Grade Descriptors	В	Demonstrate an excellent u applications through correct and being able to carry out a Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation Demonstrates poor and inac	inderstanding of key concepts and ideas by bity analysing problems, clearly and elegantly computations carefully and correctly, and with ristanding of key concepts and ideas by beir thy analysing problems, but with some minor ms and presentation or with some minor compe understanding of key concepts and ideas by ites in applying the theorems through incominor computational errors.  anding of key concepts and ideas by being a applying the theorems through incorrectly annal errors.  dequate understanding by not being able to ic	eing able to identify the appropresenting correct logical reas some innovative approaches og able to identify the approprinadequacies in arguments, is utational errors.  y being able to correctly identify analysing problems vable to correctly identify appropriate to correctly identified to correctly identif	opriate theorems and the soning and argumentation to solving problems. The private theorems and the dentifying the appropriate theorems with poor argument and opriate theorems, but with gument or presentation of the solution of the problems.		
Grade Descriptors (A+ to F)	A B C D Fail	Demonstrate an excellent u applications through correct and being able to carry out on Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequacipresentation or a number of Demonstrate some understaubstantial inadequacies in with substantial computation	inderstanding of key concepts and ideas by bity analysing problems, clearly and elegantly computations carefully and correctly, and with ristanding of key concepts and ideas by beir thy analysing problems, but with some minor ms and presentation or with some minor compe understanding of key concepts and ideas by ites in applying the theorems through incominor computational errors.  anding of key concepts and ideas by being a applying the theorems through incorrectly annal errors.  dequate understanding by not being able to ic	eing able to identify the appropresenting correct logical reas some innovative approaches og able to identify the approprinadequacies in arguments, is utational errors.  y being able to correctly identify analysing problems vable to correctly identify appropriate to correctly identified to correctly identif	opriate theorems and the soning and argumentation to solving problems. The private theorems and the dentifying the appropriate theorems with poor argument and opriate theorems, but with gument or presentation of the solution of the problems.		
Grade Descriptors (A+ to F) Course Type	A B C D Fail	Demonstrate an excellent u applications through correct and being able to carry out or Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of Demonstrate some understs substantial inadequacies in with substantial computation Demonstrates poor and inacheing able to complete the sisted course	inderstanding of key concepts and ideas by bity analysing problems, clearly and elegantly computations carefully and correctly, and with ristanding of key concepts and ideas by beir thy analysing problems, but with some minor ms and presentation or with some minor compe understanding of key concepts and ideas by ites in applying the theorems through incominor computational errors.  anding of key concepts and ideas by being a applying the theorems through incorrectly annal errors.  dequate understanding by not being able to ic	eing able to identify the appropresenting correct logical reas some innovative approaches og able to identify the approprinadequacies in arguments, is utational errors.  y being able to correctly identify analysing problems vable to correctly identify appropriate to correctly identified to correctly identif	opriate theorems and the soning and argumentation to solving problems. The private theorems and the dentifying the appropriate theorems with poor argument and opriate theorems, but with gument or presentation of the solution of the problems.		
course Type	A B C D Fail Lecture-ba	Demonstrate an excellent u applications through correct and being able to carry out or Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of Demonstrate some understs substantial inadequacies in with substantial computation Demonstrates poor and inacheing able to complete the sisted course	inderstanding of key concepts and ideas by b thy analysing problems, clearly and elegantly computations carefully and correctly, and with rstanding of key concepts and ideas by beir thy analysing problems, but with some minor ns and presentation or with some minor compice understanding of key concepts and ideas by ies in applying the theorems through income in minor computational errors. anding of key concepts and ideas by being a applying the theorems through incorrectly and all errors. dequate understanding by not being able to ic solution.	eing able to identify the appropresenting correct logical reas some innovative approaches og able to identify the approprinadequacies in arguments, is utational errors.  y being able to correctly identify analysing problems vable to correctly identify appropriate to correctly identified to correctly identif	opriate theorems and the soning and argumentation to solving problems. Driate theorems and the dentifying the appropriate theorems with poor argument and opriate theorems, but with gument or presentation or their applications, or necessity and the solutions of their applications, or necessity and their applications, or necessity and the solutions of their applications, or necessity and the solutions of the solutions		
Grade Descriptors (A+ to F)  Course Type Course Teaching	B C D Fail Lecture-ba Activities Lectures Tutorials	Demonstrate an excellent u applications through correct and being able to carry out on Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequacipresentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation Demonstrates poor and inact being able to complete the sissed course	inderstanding of key concepts and ideas by b thy analysing problems, clearly and elegantly computations carefully and correctly, and with rstanding of key concepts and ideas by beir thy analysing problems, but with some minor ns and presentation or with some minor compice understanding of key concepts and ideas by ies in applying the theorems through income in minor computational errors. anding of key concepts and ideas by being a applying the theorems through incorrectly and all errors. dequate understanding by not being able to ic solution.	eing able to identify the appropresenting correct logical reas some innovative approaches og able to identify the approprinadequacies in arguments, is utational errors.  y being able to correctly identify analysing problems vable to correctly identify appropriate to correctly identified to correctly identif	priate theorems and the soning and argumentation to solving problems. In the soning area and the dentifying the appropriate theorems and the dentifying the appropriate theorems with poor argument and appriate theorems, but with gument or presentation or their applications, or not their applications, or not their applications, or not their applications.		
Grade Descriptors (A+ to F)  Course Type Course Teaching	B C D Fail Lecture-ba Activities Lectures	Demonstrate an excellent u applications through correct and being able to carry out on Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequacipresentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation Demonstrates poor and inact being able to complete the sissed course	inderstanding of key concepts and ideas by b thy analysing problems, clearly and elegantly computations carefully and correctly, and with rstanding of key concepts and ideas by beir thy analysing problems, but with some minor ns and presentation or with some minor compice understanding of key concepts and ideas by ies in applying the theorems through income in minor computational errors. anding of key concepts and ideas by being a applying the theorems through incorrectly and all errors. dequate understanding by not being able to ic solution.	eing able to identify the appropresenting correct logical reas some innovative approaches og able to identify the approprinadequacies in arguments, is utational errors.  y being able to correctly identify analysing problems vable to correctly identify appropriate to correctly identified to correctly identif	priate theorems and the soning and argumentation to solving problems. briate theorems and the dentifying the appropriate theorems tify appropriate theorems with poor argument and appriate theorems, but with gument or presentation or their applications, or not their applications, or not the solutions and the solutions are the solutions.		
Course Type Course Teaching Learning Activities  Assessment Methods	B C D Fail Lecture-ba Activities Lectures Tutorials	Demonstrate an excellent u applications through correct and being able to carry out on Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequacipresentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation Demonstrates poor and inact being able to complete the sissed course	inderstanding of key concepts and ideas by b thy analysing problems, clearly and elegantly computations carefully and correctly, and with rstanding of key concepts and ideas by beir thy analysing problems, but with some minor ns and presentation or with some minor compice understanding of key concepts and ideas by ies in applying the theorems through income in minor computational errors. anding of key concepts and ideas by being a applying the theorems through incorrectly and all errors. dequate understanding by not being able to ic solution.	eing able to identify the appropresenting correct logical reas some innovative approaches og able to identify the approprinadequacies in arguments, is utational errors.  y being able to correctly identify analysing problems vable to correctly identify appropriate to correctly identified to correctly identif	priate theorems and the soning and argumentation to solving problems. The priate theorems and the dentifying the appropriate theorems with poor argument and priate theorems, but with gument or presentation of their applications, or not t		
Course Type Course Teaching Learning Activities	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods	Demonstrate an excellent u applications through correct and being able to carry out or Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequacipresentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation Demonstrates poor and inacting able to complete the sissed course  Self study	Inderstanding of key concepts and ideas by bity analysing problems, clearly and elegantly computations carefully and correctly, and with restanding of key concepts and ideas by beintly analysing problems, but with some minor may and presentation or with some minor compute understanding of key concepts and ideas by eight in applying the theorems through incommon incomputational errors.  anding of key concepts and ideas by being a applying the theorems through incorrectly annual errors.  dequate understanding by not being able to its solution.  Details  Details	eing able to identify the appropresenting correct logical reas some innovative approaches go able to identify the approprinadequacies in arguments, is utational errors.  The problems with the appropriate to correctly identify analysing problems with all the correctly identify appropriate theorems of the problems with poor and dentify	priate theorems and the soning and argumentation to solving problems. The priate theorems and the dentifying the appropriate theorems with poor argument and priate theorems, but with gument or presentation or their applications, or not be a solvent and the priate theorems. When the prist is a solvent and the prist is		
Course Type Course Teaching Learning Activities	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignment	Demonstrate an excellent u applications through correct and being able to carry out or Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation Demonstrates poor and inacting able to complete the sissed course  Self study	inderstanding of key concepts and ideas by b thy analysing problems, clearly and elegantly computations carefully and correctly, and with restanding of key concepts and ideas by being the understanding of key concepts and ideas by being and presentation or with some minor compute understanding of key concepts and ideas by eiges in applying the theorems through incomminor computational errors. and ideas by being a applying the theorems through incorrectly an anal errors. dequate understanding by not being able to its solution.	reing able to identify the appropresenting correct logical reas some innovative approaches any able to identify the approprinadequacies in arguments, in utational errors.  y being able to correctly identify analysing problems which is also to correctly identify appropriate theorems of all the proprince of the p	priate theorems and the soning and argumentation to solving problems. The price of the control o		
Course Type Course Teaching Learning Activities	B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignment Examination	Demonstrate an excellent u applications through correct and being able to carry out or Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation Demonstrates poor and inacting able to complete the sissed course  Self study	Inderstanding of key concepts and ideas by bity analysing problems, clearly and elegantly computations carefully and correctly, and with restanding of key concepts and ideas by beintly analysing problems, but with some minor may and presentation or with some minor compute understanding of key concepts and ideas by eight in applying the theorems through incommon incomputational errors.  anding of key concepts and ideas by being a applying the theorems through incorrectly annual errors.  dequate understanding by not being able to its solution.  Details  Details	reing able to identify the appropresenting correct logical reas some innovative approaches go able to identify the appropriate dequacies in arguments, in utational errors.  The solution of the appropriate the correctly identify analysing problems with poor any able to correctly identify approaches the appropriate theorems of the appropr	priate theorems and the soning and argumentation to solving problems. The soning area of		
Course Type Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignmen Examination Test Ian Jacque M. J. Ross Martin Antil	Demonstrate an excellent u applications through correct and being able to carry out or Demonstrate a good under applications through correct theorems or their application. Demonstrate an acceptable but with some inadequacipresentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation. Demonstrates poor and inaction able to complete the sissed course.  Self study  The study  The study  Self study  The study of	Inderstanding of key concepts and ideas by bity analysing problems, clearly and elegantly computations carefully and correctly, and with restanding of key concepts and ideas by beintly analysing problems, but with some minor may and presentation or with some minor compute understanding of key concepts and ideas by eight in applying the theorems through incommon incomputational errors.  anding of key concepts and ideas by being a applying the theorems through incorrectly annual errors.  dequate understanding by not being able to its solution.  Details  Details	weing able to identify the appropresenting correct logical reas some innovative approaches gable to identify the appropriate to identify the appropriate in adequacies in arguments, in utational errors.  The property is being able to correctly identify and problems with poor and all problems with poor and all problems with poor and identify appropriate theorems of the problems with poor and identify appropriate theorems of	priate theorems and the soning and argumentation to solving problems. The soning area of the soning and argumentation to solving problems. The solving problems are dentifying the appropriate theorems and the dentifying the appropriate theorems with poor argument and solving the solving argument or presentation or their applications, or not their applications, or not solving argument and solving argument or presentation or their applications, or not solving argument a		
Course Type Course Type Course Teaching Learning Activities Assessment Methods and Weighting Required/recommended reading and conline materials	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignmen Examination Test Ian Jacque M. J. Ross Martin Antil	Demonstrate an excellent u applications through correct and being able to carry out or Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation Demonstrates poor and inact being able to complete the sissed course  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.  Self study  The substantial computation of the substantial inadequacies in with substantial computation.	inderstanding of key concepts and ideas by bity analysing problems, clearly and elegantly computations carefully and correctly, and with restanding of key concepts and ideas by being the understanding of key concepts and ideas by being and presentation or with some minor compute understanding of key concepts and ideas by leies in applying the theorems through incommination of key concepts and ideas by being an applying the theorems through incommination of key concepts and ideas by being a applying the theorems through incorrectly an and errors.  Details  Details  Details  Tutorials and Assignments  Tutorials and Business (New York: Pefor Economists (London: Routledge, s: Mathematics for Economics and F	weing able to identify the appropresenting correct logical reas some innovative approaches gable to identify the appropriate to identify the appropriate in adequacies in arguments, in utational errors.  The property is being able to correctly identify and problems with poor and all problems with poor and all problems with poor and identify appropriate theorems of the problems with poor and identify appropriate theorems of	priate theorems and the soning and argumentation to solving problems. The soning area of the soning and argumentation to solving problems. The solving problems are dentifying the appropriate theorems and the dentifying the appropriate theorems with poor argument and solving the solving argument or presentation or their applications, or not their applications, or not solving argument and solving argument or presentation or their applications, or not solving argument a		
Grade Descriptors	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignmee Examination Test In Jacquee M. J. Ross Martin Anti Methods a	Demonstrate an excellent u applications through correct and being able to carry out or Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation Demonstrates poor and inact being able to complete the sissed course  Self study  The study  Self study  Self study  The solution of the solution	inderstanding of key concepts and ideas by bity analysing problems, clearly and elegantly computations carefully and correctly, and with restanding of key concepts and ideas by being the understanding of key concepts and ideas by being and presentation or with some minor compute understanding of key concepts and ideas by leies in applying the theorems through incommination of key concepts and ideas by being an applying the theorems through incommination of key concepts and ideas by being a applying the theorems through incorrectly an and errors.  Details  Details  Details  Tutorials and Assignments  Tutorials and Business (New York: Pefor Economists (London: Routledge, s: Mathematics for Economics and F	weing able to identify the appropresenting correct logical reas some innovative approaches gable to identify the appropriate to identify the appropriate in adequacies in arguments, in utational errors.  The property is being able to correctly identify and problems with poor and all problems with poor and all problems with poor and identify appropriate theorems of the problems with poor and identify appropriate theorems of	priate theorems and the soning and argumentation to solving problems. The soning area of the soning and argumentation to solving problems. The solving problems are dentifying the appropriate theorems and the dentifying the appropriate theorems with poor argument and solving the solving argument or presentation or their applications, or not their applications, or not solving argument and solving argument or presentation or their applications, or not solving argument a		

MATH1011	University mathematics I (6 credits)	Academic Year	2017			
Offering Department	Mathematics	Quota				
Course Co-ordinator	Dr H Y Zhang, Mathematics (hyzhang@maths.hku.hk)					
Teachers Involved	(Dr H Y Zhang, Mathematics)					
Course Objectives	This course aims at students with only HKDSE Mathematics (or equivalent) basic knowledge of mathematics that serves as essential foundation in various followed by MATH1013.					
Course Contents & Topics	<ul> <li>Sets, Venn diagram, set operations.</li> <li>Permutations, combinations and elementary probabilities.</li> <li>Mathematical induction.</li> <li>Exponential and logarithmic functions.</li> <li>Trigonometric functions, trigonometric formulae.</li> <li>Limits of algebraic, exponential and logarithmic functions.</li> <li>Derivatives of algebraic, exponential and logarithmic functions.</li> <li>Differentiation rules: addition, product, quotient and chain rule.</li> </ul>					

		and minima.				
	- Indefinite and definite integrals Area.					
	- Integrat	ion by substitution.				
	- Trapezoidal rule with error estimation.					
Course Learning			s course, students should be able t			
Outcomes	CLO 1		calculate probabilities; and prove I			
	CLO 2		ing exponential, logarithmic and tri	gonometric functions		
	CLO 3 CLO 4	evaluate limits and de	ite and indefinite integrals			
	CLO 4		ms such as determining maxima ar	nd minima: finding area		
Pre-requisites	NIL	301VC practical problet	ms such as determining maxima ar	id milima, inding area		
(and Co-requisites and Impermissible combinations)	The cour Mathema	itics or equivalent befor	ite, but students are expected to re enrolling the course; and above in Module 1 or Module 2 of I			
Offer in 2017 - 2018		t sem 2nd sem Offe		Examination		
Grade Descriptors	A 131		t understanding of key concepts and ideas		· · · · · · · · · · · · · · · · · ·	
(A+ to F)	A	applications through corre and being able to carry ou	ectly analysing problems, clearly and elega at computations carefully and correctly, and	ntly presenting correct logical rea with some innovative approaches	soning and argumentation to solving problems.	
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail	Demonstrate poor and incomplete the	adequate understanding by not being able e solution.	to identify appropriate theorems	or their applications, or not	
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
		/ Self study			100	
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents	assignments, tutorials, participation, etc	5	CLO 1,2,3,4,5	
	Examina	tion		50	CLO 1,2,3,4,5	
	Test		3 tests	45	CLO 1,2,3,4,5	
Required/recommended reading and conline materials	(Custom	textbook) MATH1011 (	Pearson, 2014)			
Course Website	moodle.h	ku.hk				
Additional Course	Tutorial ti	metable:				
Information			metable/tutorials1718_S1.pdf metable/tutorials1718_S2.pdf			

MATH1013	Universit	ty mathematics II (	6 credits)	Academic Year	2017	
Offering Department	Mathemati	CS		Quota	500	
Course Co-ordinator	Dr C W Wo	ong, Mathematics (cw/	wongab@hku.hk)			
Teachers Involved	(Dr C W W	ong,Mathematics)				
Course Objectives	background various dis	d and provides them v	with basic knowledge of ca	lus Module 1 or Core Mathematics alculus and some linear algebra that ourses such as MATH2012, MATH21	can be applied in	
Course Contents & Topics	<ul> <li>Limits; co</li> <li>Mean valiting</li> <li>Higher on</li> <li>Radian, c</li> <li>Definite a</li> <li>Complex</li> <li>Application</li> </ul>	der derivatives; maximal calculus of trigonometri and indefinite integrals; numbers, polar form, ons: Solving first order	ibility.  Iferentiation; L'Hopital's rule  I a and minima; graph sketo  I functions.  Integration by substitutions  de Moivre's formula.  differential equations		artial fractions.	
Course Learning		•	course, students should be			
Outcomes	CLO 1 des	scribe properties of a f	unction and an inverse fund	ction		
	CLO 2 evaluate various kinds of limits, and determine continuity and differentiability of functions					
	CLO 3 apply advanced rules/techniques of differentiation and integration to compute derivatives and; integrals; sketch graphs of functions					
	CLO 4 solve problems involving complex numbers					
	CLO 5 solve simple first order ordinary differential equations					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MA	ATH1009 or MATH101	,	ematics or equivalent, or 1851 and MATH1853), or have alread	ly enrolled in this	
Offer in 2017 - 2018	Y 1st s	sem 2nd sem Offer	r in 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	Α	applications through correct	ctly analysing problems, clearly a	nd ideas by being able to identify the appropriat nd elegantly presenting correct logical reasonin ctly, and with some innovative approaches to so	g and argumentation	

	В	applications through correct theorems or their application	ly analysing problems, but is and presentation or with s	and ideas by being able to identify the approp with some minor inadequacies in arguments, in some minor computational errors.	dentifying the appropriate		
	С		es in applying the theore	epts and ideas by being able to correctly ident ms through incorrectly analysing problems w			
	D		applying the theorems throu	I ideas by being able to correctly identify apprough incorrectly analysing problems with poor arg			
	Fail	Demonstrate poor and inade being able to complete the s		ot being able to identify appropriate theorems of	r their applications, or not		
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	1	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		10	CLO 1,2,3,4,5		
	Examinati	ion		50	CLO 1,2,3,4,5		
	Test			40	CLO 1,2,3,4,5		
Required/recommended reading and	Adrian Ba 2007)	nner: The Calculus Lifes	saver: All the Tools Y	ou Need to Excel at Calculus (Prince	ton University Press,		
online materials	George B.	Thomas, Maurice D. We	eir and Joel Hass: Tho	omas' Calculus (12th edition, Addison V	Wesley)		
Course Website	moodle.hk	u.hk		· · · · · · · · · · · · · · · · · · ·			
Additional Course	Students v	who have passed MATH	1013 are not allowed	to take MATH1009.			
Information	Tutorial tin	netable:					
	http://hkun	orial timetable: ://hkumath.hku.hk/~math/Timetable/tutorials1718_S1.pdf ://hkumath.hku.hk/~math/Timetable/tutorials1718_S2.pdf					

MATH1641	Mathematical laboratory and modeling (6 credits)  Academic Year 201				ar 2017		
Offering Department	Mathemati	CS			Quota	30	
Course Co-ordinator	TBC, Math	ematics ()					
Teachers Involved							
Course Objectives	This course introduces a powerful and free computer software Scilab for scientific research. The programming language will be taught via a number of mathematical models in Physics, Chemistry, Biology Ecology, Statistics and Management. Some basic and important techniques in Calculus and Linear Algebra wil also be covered.						
Course Contents & Topics	Scilab. Elementary mathematical modeling, predator-prey models, epidemic models, host-parasite model etc. Data fitting models and simulation of simple random variable. Random walk models and inventory models. Differentiation and integration of one variable. Elementary linear algebra.						
Course Learning Outcomes	CLO 1 r	ecognize the important	course, students should be able ce of numerical methods in math	nematical model	-		
			braic and arithmetic computation		environment		
			rams in Scilab programming lang				
			problems using interactive Scila		aromo		
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 5 solve moderately complicated numerical problems by writing Scilab programs  NIL						
Offer in 2017 - 2018	N Offe	r in 2018 - 2019 : N			Examination		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and Scilab skills by being able to identify the appropriate Scilab environments and their applications through correctly analysing problems, clearly and efficiently presenting correct algorithms and being able to solve numerical problems by writing Scilab programs carefully and correctly, and with some innovative approaches to solving problems.  B Demonstrate a good understanding of key concepts and Scilab skills by being able to identify the appropriate Scilab						
	environments and their applications through correctly analysing problems, but with some minor inadequacies in identifying the appropriate Scilab components or presenting correct algorithms or with some minor programming/computational errors.						
	Demonstrate an acceptable understanding of key concepts and Scilab skills by being able to correctly identify appropriate Scilab environments, but with some inadequacies in solving numerical problems with Scilab through incorrectly analysing problems with inappropriate Scilab environments or with a number of minor programming/computational errors.						
	D	Demonstrate some understanding of key concepts and Scilab skills by being able to correctly identify appropriate Scilab environments, but with substantial inadequacies in solving numerical problems with Scilab through incorrectly analysing problems with inappropriate Scilab environments or with substantial programming/computational errors.					
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate Scilab environments or their applications, or not being able to complete the solution.						
Course Type	Lecture-ba	sed course	and to complete the condition.				
Course Teaching	Activities		Details			No. of Hours	
& Learning Activities	Lectures		Details		36		
_	Tutorials					12	
	Reading /	Self study				100	
Assessment Methods and Weighting	Methods		Details	_	ing in final grade (%)	Assessment Methods to CLO Mapping	
	Examination	on			50	CLO 1,2,3,4,5	
	Test				50	CLO 1,2,3,4,5	
Required/recommended reading and online materials	F. R. Giord		ructor. P. Fox: A first course in mathen	natical modelinç	g (Pacific Grov	re, CA: Brooks/Cole	

Academic Year | 2017

		alicai ili <del>c</del> tiibus ibi	r actuarial science I (6 cred	1(5)			
Offering Department	Mathemat	ics		Quota			
Course Co-ordinator	Dr J T Cha	an, Mathematics (jtcha	an@hku.hk)		'		
Teachers Involved	(Dr J T Ch	an,Mathematics)					
Course Objectives	This course is the first of the two mathematics courses designed to provide actuarial science students with a solid background of calculus of one and several variables and an introduction to linear algebra. The course focuses or single variable calculus and elementary matrix theory. It aims at students with Core Mathematics plus Module 1 or Core Mathematics plus Module 2 background.						
Course Contents		s; graphs; inverse fun					
& Topics	<ul> <li>Limits, continuity and differentiability.</li> <li>Mean value theorem; implicit differentiation; L'Hopital's rule.</li> <li>Bisection method and Newton's method.</li> <li>Higher order derivatives, maxima and minima, graph sketching.</li> <li>Taylor approximation and error estimation.</li> <li>Improper integrals, partial fractions, integration by parts.</li> <li>Numerical integration, Trapezoidal rule and Simpson's rule.</li> <li>Basic matrix and vector (of orders 2 and 3) operations, determinants.</li> <li>Simple differential equations.</li> </ul>						
Course Learning	On succes	sful completion of this	s course, students should be able	e to:			
Outcomes	CLO 1 de	scribe properties of a	function and an inverse function				
	CLO 3 ap sk CLO 4 ap CLO 5 pe	ply advanced rules/te etch graphs of functio proximate integrals by rform matrix and vector		integration to compute deriva ants			
Pre-requisites		•	thematics plus Module 1, or Lev	•	amatica plua Madula		
(and Co-requisites and Impermissible combinations)	Not for stu	<ol> <li>or equivalent; and</li> <li>Not for students who have passed MATH1013 or (MATH1851 and MATH1853), or have already enrolled in thescourses.</li> <li>For BSc(ActuarSc) students only.</li> </ol>					
Offer in 2017 - 2018							
O.1.0. 11. 201. 2010	Y 1st			Examination	Dec		
Grade Descriptors (A+ to F)	Y 1st  A  B	Demonstrate an excellent applications through corre and being able to carry our Demonstrate a good unc	2019: Y t understanding of key concepts and idea ectly analysing problems, clearly and ele tt computations carefully and correctly, a derstanding of key concepts and ideas	as by being able to identify the apprograntly presenting correct logical reas nd with some innovative approaches by being able to identify the approp	priate theorems and their soning and argumentation to solving problems. oriate theorems and their		
Grade Descriptors	Α	Demonstrate an excellent applications through corre and being able to carry ou Demonstrate a good unc applications through corretheorems or their applicat Demonstrate an acceptal but with some inadequate.	2019: Y t understanding of key concepts and ide- ectly analysing problems, clearly and ele ut computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some itions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug	as by being able to identify the approgantly presenting correct logical reas and with some innovative approaches by being able to identify the appropring inadequacies in arguments, in computational errors.	priate theorems and their coning and argumentation to solving problems. oriate theorems and their dentifying the appropriate tify appropriate theorems,		
Grade Descriptors	В	Demonstrate an excellent applications through correct and being able to carry or Demonstrate a good uncapplications through correct theorems or their applications through correct theorems or their applications through correct theorems or their application with some inadequapresentation or a number Demonstrate some under substantial inadequacies	2019: Y t understanding of key concepts and idea ectly analysing problems, clearly and ele ut computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. restanding of key concepts and ideas by in applying the theorems through incorre	as by being able to identify the approgantly presenting correct logical reas and with some innovative approaches by being able to identify the approprinion inadequacies in arguments, in computational errors.  deas by being able to correctly identify incorrectly analysing problems we being able to correctly identify appropriate to correctly identification to correctly identifi	priate theorems and their coning and argumentation to solving problems. oriate theorems and their dentifying the appropriate diffy appropriate theorems, with poor argument and appriate theorems, but with		
Grade Descriptors (A+ to F)	A B C D Fail	Demonstrate an excellent applications through corr and being able to carry or Demonstrate a good uncapplications through corr theorems or their applications through corr theorems or their application bemonstrate an acceptabut with some inadequapresentation or a number Demonstrate some under substantial inadequacies with substantial computation Demonstrate poor and inbeing able to complete the	2019: Y t understanding of key concepts and ide- ectly analysing problems, clearly and ele ut computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors. adequate understanding by not being ab	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the apprograminor inadequacies in arguments, in computational errors. deas by being able to correctly ident in incorrectly analysing problems wheing able to correctly identify approactly analysing problems with poor arguments.	priate theorems and their soning and argumentation to solving problems. originate theorems and their dentifying the appropriate tify appropriate theorems, with poor argument and priate theorems, but with gument or presentation or		
Grade Descriptors (A+ to F)  Course Type	A B C D Fail Lecture-ba	Demonstrate an excellent applications through corr and being able to carry or Demonstrate a good uncapplications through corr theorems or their applications through corr theorems or their applications through corr theorems or their application Demonstrate an acceptal but with some inadequa presentation or a number Demonstrate some under substantial inadequacies with substantial computation Demonstrate poor and inbeing able to complete the ased course	2019: Y t understanding of key concepts and ide- ture analysing problems, clearly and ele at computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors.	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the apprograminor inadequacies in arguments, in computational errors. deas by being able to correctly ident in incorrectly analysing problems wheing able to correctly identify approactly analysing problems with poor arguments.	priate theorems and their soning and argumentation to solving problems. In the solving problems and their dentifying the appropriate theorems, with poor argument and appriate theorems, but with gument or presentation or their applications, or not		
Grade Descriptors (A+ to F)  Course Type Course Teaching	B C D Fail Lecture-ba Activities	Demonstrate an excellent applications through corr and being able to carry or Demonstrate a good uncapplications through corr theorems or their applications through corr theorems or their applications through corr theorems or their application Demonstrate an acceptal but with some inadequa presentation or a number Demonstrate some under substantial inadequacies with substantial computation Demonstrate poor and inbeing able to complete the ased course	2019: Y t understanding of key concepts and ide- ectly analysing problems, clearly and ele ut computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors. adequate understanding by not being ab	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the apprograminor inadequacies in arguments, in computational errors. deas by being able to correctly ident in incorrectly analysing problems wheing able to correctly identify approactly analysing problems with poor arguments.	priate theorems and their soning and argumentation to solving problems. In the priate theorems and their dentifying the appropriate theorems, with poor argument and upriate theorems, but with gument or presentation or retheir applications, or not No. of Hours		
Grade Descriptors (A+ to F)  Course Type Course Teaching	B C D Fail Lecture-ba Activities Lectures	Demonstrate an excellent applications through corr and being able to carry or Demonstrate a good uncapplications through corr theorems or their applications through corr theorems or their applications through corr theorems or their application Demonstrate an acceptal but with some inadequa presentation or a number Demonstrate some under substantial inadequacies with substantial computation Demonstrate poor and inbeing able to complete the ased course	2019: Y t understanding of key concepts and ide- ture analysing problems, clearly and ele at computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors.	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the apprograminor inadequacies in arguments, in computational errors. deas by being able to correctly ident in incorrectly analysing problems wheing able to correctly identify approactly analysing problems with poor arguments.	priate theorems and their soning and argumentation to solving problems. or indicate theorems and their dentifying the appropriate theorems, with poor argument and appriate theorems, but with gument or presentation or retheir applications, or not No. of Hours 36		
Grade Descriptors (A+ to F)  Course Type Course Teaching	B C D Fail Lecture-ba Activities Lectures Tutorials	Demonstrate an excellent applications through corrado being able to carry or Demonstrate a good uncapplications through corrections through corrections through corrections of their applications through corrections of their applications through corrections of their applications through corrections through corrections the properties of their applications of their applicatio	2019: Y t understanding of key concepts and ide- ture analysing problems, clearly and ele at computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors.	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the apprograminor inadequacies in arguments, in computational errors. deas by being able to correctly ident in incorrectly analysing problems wheing able to correctly identify approactly analysing problems with poor arguments.	priate theorems and their soning and argumentation to solving problems. In the properties of the principles of the properties of the properties of the properties of the principles of the properties of the prope		
Grade Descriptors (A+ to F)  Course Type Course Teaching	B C D Fail Lecture-ba Activities Lectures Tutorials	Demonstrate an excellent applications through corr and being able to carry or Demonstrate a good uncapplications through corr theorems or their applications through corr theorems or their applications through corr theorems or their application Demonstrate an acceptal but with some inadequa presentation or a number Demonstrate some under substantial inadequacies with substantial computation Demonstrate poor and inbeing able to complete the ased course	2019: Y t understanding of key concepts and ide- ture analysing problems, clearly and ele at computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors.	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the apprograminor inadequacies in arguments, in computational errors. deas by being able to correctly ident in incorrectly analysing problems wheing able to correctly identify approactly analysing problems with poor arguments.	priate theorems and their soning and argumentation to solving problems. or indicate theorems and their dentifying the appropriate theorems, with poor argument and appriate theorems, but with gument or presentation or retheir applications, or not No. of Hours 36		
Grade Descriptors	B C D Fail Lecture-ba Activities Lectures Tutorials	Demonstrate an excellent applications through corrado being able to carry or Demonstrate a good uncapplications through corrections through corrections through corrections of their applications through corrections of their applications through corrections of their applications through corrections through corrections the properties of their applications of their applicatio	2019: Y t understanding of key concepts and ide- ture analysing problems, clearly and ele at computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors.	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the apprograminor inadequacies in arguments, in computational errors. deas by being able to correctly ident in incorrectly analysing problems wheing able to correctly identify approactly analysing problems with poor arguments.	priate theorems and their soning and argumentation to solving problems. In the properties of the principles of the properties of the properties of the properties of the principles of the properties of the prope		
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	B C D Fail Lecture-ba Activities Lectures Tutorials Reading /	sem Offer in 2018 - Demonstrate an excellent applications through corrand being able to carry or Demonstrate a good und applications through correct theorems or their applications through correct theorems or their application through correct theorems or their application through correct theorems or their application or an umber Demonstrate some under substantial inadequacies with substantial computation being able to complete the sed course.  Self study	2019: Y t understanding of key concepts and idea ectly analysing problems, clearly and ele ut computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some itions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors. adequate understanding by not being ab e solution.  Details	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the appropriate in a computational errors. It is a computational errors are some property of the pro	priate theorems and their soning and argumentation to solving problems. Driate theorems and their dentifying the appropriate theorems, with poor argument and priate theorems, but with gument or presentation or retheir applications, or not   No. of Hours  36  12  100  Assessment Methods		
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods	sem Offer in 2018 - Demonstrate an excellent applications through corrand being able to carry or Demonstrate a good und applications through correct theorems or their applications through correct theorems or their application through correct theorems or their application through correct theorems or their application or an umber Demonstrate some under substantial inadequacies with substantial computation being able to complete the sed course.  Self study	2019: Y t understanding of key concepts and idea ectly analysing problems, clearly and ele ut computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some itions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors. adequate understanding by not being ab e solution.  Details	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the appropriate in a computational errors. deas by being able to correctly ident in incorrectly analysing problems where the correctly identify analysing problems with a course grade to identify appropriate to identify appropriate to identify appropriate to identify appropriate theorems of the course grade (%)	priate theorems and their soning and argumentation to solving problems.  The priate theorems and their dentifying the appropriate theorems, with poor argument and appriate theorems, but with gument or presentation or reference their applications, or not their appl		
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods  Examinati Test George B edition)	Sem Offer in 2018 - Demonstrate an excellent applications through corn and being able to carry or Demonstrate a good und applications through corn theorems or their applicat Demonstrate an acceptat but with some inadequa presentation or a number Demonstrate some under substantial inadequacies with substantial computat Demonstrate poor and inbeing able to complete the ased course  Self study  On	2019: Y t understanding of key concepts and ide- edut analysing problems, clearly and elle but computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. restanding of key concepts and ideas by in applying the theorems through incorre ional errors.  Details  Details  Details  2 tests d by Maurice D. Weir and Joel	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the appropriate in a computational errors. Ideas by being able to correctly identify incorrectly analysing problems where the incorrectly analysing problems with poor arguments and the incorrectly analysing problems with poor arguments.  Weighting in final course grade (%)  50  50  Hass: Thomas' Calculus (Adams)	priate theorems and their soning and argumentation to solving problems. The priate theorems and their dentifying the appropriate theorems, with poor argument and appriate theorems, but with gument or presentation or their applications, or not their applications, or not their applications and their applications and their applications and their applications are their applications, or not their appl		
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods  Examinati Test George B edition) Steven J.	Sem Offer in 2018 - Demonstrate an excellent applications through correct and service and being able to carry or demonstrate a good uncapplications through correct theorems or their applications through correct theorems or their applications through correct and acceptated but with some inadequapresentation or a number Demonstrate some under substantial inadequacies with substantial computation being able to complete the ased course.  Self study  On  Thomas; as revised.	2019: Y t understanding of key concepts and ide- ture analysing problems, clearly and ele ut computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. rstanding of key concepts and ideas by in applying the theorems through incorre ional errors. adequate understanding by not being ab e solution.  Details  Details  2 tests	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the appropriate in a computational errors. Ideas by being able to correctly identify incorrectly analysing problems where the incorrectly analysing problems with poor arguments and the incorrectly analysing problems with poor arguments.  Weighting in final course grade (%)  50  50  Hass: Thomas' Calculus (Adams)	priate theorems and their soning and argumentation to solving problems. The priate theorems and their dentifying the appropriate theorems, with poor argument and appriate theorems, but with gument or presentation or their applications, or not their applications, or not their applications and their applications and their applications and their applications are their applications, or not their appl		
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials Course Website	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods  Examinati Test George B edition) Steven J. moodle.hk	Sem Offer in 2018 - Demonstrate an excellent applications through correct and being able to carry or Demonstrate a good uncapplications through correct theorems or their applications through correct theorems or their applications through correct theorems or their application or an umber Demonstrate some under substantial inadequacies with substantial computation Demonstrate poor and in being able to complete the ased course  Self study  On  Thomas; as revised Leon: Linear Algebra such applications the correct and the constant a	2019: Y t understanding of key concepts and ide- edut analysing problems, clearly and elle but computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. restanding of key concepts and ideas by in applying the theorems through incorre ional errors.  Details  Details  Details  2 tests d by Maurice D. Weir and Joel	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the appropriate in a computational errors. Ideas by being able to correctly identify incorrectly analysing problems where the incorrectly analysing problems with poor arguments and the incorrectly analysing problems with poor arguments.  Weighting in final course grade (%)  50  50  Hass: Thomas' Calculus (Adams)	priate theorems and their soning and argumentation to solving problems. The priate theorems and their dentifying the appropriate theorems, with poor argument and appriate theorems, but with gument or presentation or their applications, or not their applications, or not their applications and their applications and their applications and their applications are their applications, or not their appl		
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods  Examinati Test George B edition) Steven J. moodle.hk Tutorial tin	sem Offer in 2018 - Demonstrate an excellent applications through corrado being able to carry or Demonstrate a good und applications through correct theorems or their applications through correct theorems or their applications or their application or an umber Demonstrate an acceptable but with some inadequa presentation or a number Demonstrate some under substantial inadequacies with substantial computation being able to complete the sed course.  Self study  On  Thomas; as revised Leon: Linear Algebra with the teacher in the control of the	2019: Y t understanding of key concepts and ide- edut analysing problems, clearly and elle but computations carefully and correctly, a derstanding of key concepts and ideas ectly analysing problems, but with some tions and presentation or with some mino ble understanding of key concepts and i acies in applying the theorems throug of minor computational errors. restanding of key concepts and ideas by in applying the theorems through incorre ional errors.  Details  Details  Details  2 tests d by Maurice D. Weir and Joel	as by being able to identify the approgantly presenting correct logical reas nd with some innovative approaches by being able to identify the appropriate in a computational errors. Ideas by being able to correctly identify incorrectly analysing problems where the incorrectly analysing problems with poor arguments and the incorrectly analysing problems with poor arguments.  Weighting in final course grade (%)  50  50  Hass: Thomas' Calculus (Adams)	priate theorems and the soning and argumentation to solving problems. In the soning and argumentation to solving problems. In the soning and the dentifying the appropriate theorems and the dentifying the appropriate theorems with poor argument and solving a solving and the solving argument or presentation or their applications, or not solving a		

MATH1851	Calculus and ordinary differential equations (6 credits)	Academic Year	2017				
Offering Department	Mathematics	Quota	700				
Course Co-ordinator	Prof K M Tsang (1st sem); Dr Y K Lau (2nd sem), Mathematics (kmtsang@maths.hku.hk; yklau@maths.hku.hk)						
Teachers Involved	(Dr W F Lee, Mechanical Engineering) (Dr Y Chen, Mechanical Engineering) (Dr Y K Lau, Mathematics) (Prof K M Tsang, Mathematics) (Prof K W Chow, Mechanical Engineering)						
Course Objectives	In this course, students will be introduced to fundamental concepts of calculus and ordinary differential equations with a view on applications in different engineering fields. A concrete foundation of mathematics that underpins the various engineering subjects will be built. Mathematical concepts and principles, as well as some typical engineering applications, would be emphasized so that students could enhance their mathematical skills in solving engineering problems, and be well prepared in learning a higher level of applied mathematics required in different						
Course Contents & Topics	engineering disciplines.  - Differential and integral calculus (single variable) [limits and continuity, derivatives, (higher-order) derivative elementary functions, derivatives by implicit differentiation, the mean value theorem, L'H\^{o}pital's rule, param representation of curves, polar coordinates, indefinite integrals, integration by parts, partial fraction decomposition, definite integrals, the fundamental theorem of calculus, and their applications]  - Ordinary differential equations [first order equations, integrating factors and linear equations, Bernoulli equations]						

Course Learning Outcomes	equations of parame physical ir - Laplace derivatives fractions, s On success CLO 1 de	with constant coefficient ters, higher-order inhom inplication of resonance, transforms [Laplace transforms derivative solution of linear different in terms of this commentate the commen	s, characteristic polynomia ogeneous linear ordinary of Cauchy-Euler equations, a ansforms of elementary fies of Laplace transform, fitial equations (initial value ourse, students should be and understanding of basic	unctions, inverse Laplace transforms, and second shifting theorems, problems) using Laplace transformable to: calculus and ordinary differential of	fficients and variation rticular solutions and orms, transforms of convolutions, partial ms] equations as well as	
	de inv CLO 2 ap pr	tails for the solution, and volved uply mathematical skills to bollem, identify the appropriate the second stress of the second stress	nd accurately correlate the omodel and solve some bases	ering applications: unerringly perf e solution approach with the fun asic physical/engineering problem s, articulate a convincing rational correctly find the solution	damental concepts s: analyze the given	
	CLO 3 un po re: CLO 4 ex ex vit	derstand well establish tential applications in er sonance where large am plore the technique and ample. Appreciate the prations and signal process.	ed methods to solve diffingineering topics like oscill plitude displacements can dusage of integral transfingurer of these techniquessing	ferential equations, and correlate ations and electric circuits. Identif	fy the occurrence of m as an illustrative d applications like	
	dis	sciplines				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M		lodule 2 of HKDSE Mather ineering students.)	natics or equivalent, or		
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offer i	n 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.					
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems and methods or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems					
	D	and methods, but with some inadequacies in applying them through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.				
	Fail	presentation or with substant	tial computational errors. lequate understanding by not be	eing able to identify appropriate theorem		
Course Type		ased course	<b>.</b>			
Course Teaching & Learning Activities	Activities	1	Details		No. of Hours	
& Learning Activities	Lectures Tutorials				36 12	
		Self study			100	
Assessment Methods and Weighting	Methods	Con study	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		10	CLO 1,2,3,4,5	
	Examinat	ion		70	CLO 1,2,3,4,5	
	Test				CLO 1,2,3,4,5	
Required/recommended reading and online materials	G.B. Thon	nas, et al.: Thomas' Calc e, et al.: Fundamentals	s and Differential Equations ulus (Pearson Education, 2 of Differential Equations		Pearson Education,	
Course Website		dle.hku.hk/				
Additional Course			ssed test or assignment ur	nder normal circumstances.		
Information	Students a This cours Tutorial tir http://hkur	are advised not to take Ne is offered by the Depanetable: nath.hku.hk/~math/Time	1ATH1851 and MATH1853	together in the same semester. If the Faculty of Engineering.		

MATH1853	Linear algebra, probability and statistics (6 credits)	Academic Year	2017		
Offering Department	Mathematics	Quota	700		
Course Co-ordinator	Prof W K Ching (1st sem); Dr G Han (2nd sem), Mathematics (wching@hku.hk;	ghan@maths.hku	.hk)		
Teachers Involved	(Dr G Han,Mathematics) (Dr N Wong,Electrical & Electronic Engineering) (Dr Y C Wu,Electrical & Electronic Engineering) (Prof W K Ching,Mathematics)				
Course Objectives	As the complementary course of MATH1851, students will be introduced to more topics of mathematics commonly applied in engineering so that students could be further enhanced with a concrete skill in mathematics underpinned for different engineering subjects. The course emphasizes mathematical concepts, principles, analysis, and their relationship to the modelling of engineering systems. Students could be furnished with the essential mathematical skills to analytically tackle some typical engineering problems to prepare for all the engineering subjects.				
Course Contents & Topics	<ul> <li>Linear algebra [vectors and scalars, inner product, vector projection, linear matrix, determinant, matrix inverse, system of linear equations, matrix equationule, matrix rank, eigenvalue, eigenvector, matrix diagonalization, positive, netheir applications]</li> <li>Elementary complex variables [arithmetics of complex numbers, representations]</li> </ul>	n, Ġaussian elimi gative and semi-c	nation, Cramer's definiteness, and		

		ımath.hku.hk/~math/Tir ımath.hku.hk/~math/Tir	metable/tutorials1718_S1.p				
Information		se is offered by the De		353 together in the same semester. and the Faculty of Engineering.			
Additional Course				t under normal circumstances.			
Course Website	moodle.h						
online materials	C. Rorres	and H. Anton: Applica	eering Mathematics (Pears ations of Linear Algebra (W ing Mathematics (Wiley, 20				
reading and	S.J. Leor	n: Linear Algebra with A	Applications (Pearson Educ	cation, 2006, 7th ed.)			
Required/recommended			Applications (Addison-We	esley, 2012, 4th ed.)			
	Examina			80	CLO 1,2,3		
- •	Assignm	ents		20	to CLO Mapping CLO 1,2,3		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods		
		/ Self study			100		
	Tutorials				12		
& Learning Activities	Lectures						
Course Teaching	Activitie		Details	Details			
Course Type		ased course			No. of Hours		
		applications, or not being	able to complete the solution.	able to lacinary appropriate theoret	3		
	D Fail	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with substantial inadequacies in applying them through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	appropriate theorems and methods or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with some inadequacies in applying them through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.						
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the						
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to						
Offer in 2017 - 2018	Y 1s		er in 2018 - 2019 : Y	Examination	,		
(and Co-requisites and Impermissible combinations)		//ATH1011. Irse is exclusively for E	ingineering students.)				
Pre-requisites	Level 2 o		r Module 2 of HKDSE Math	nematics or equivalent, or			
		orrectly find the solutio e well prepared to cop		ngineering mathematics required in	different engineering		
	CLO 2 a	pply such knowledge hysical/engineering ap	and understanding to soplications: analyze the give	solve certain practical problems the problem, identify the appropriate used, and clearly give the mathematers.	mathematical skills,		
Outcomes	s p	tatistics as well as th	neir relationship with som details for the solution, a	near algebra, complex numbers, pr e typical physical/engineering app and accurately correlate the solution	lications: unerringly		
Course Learning	application	•	s course, students should b	pe able to:			
	Normal d	istribution, and their ap statistics [point estimate	oplications] tes, sample mean, sampl	le variance with known or unknow population variances, inference for	n mean, confidence		
	formula,	formula, random variable, (joint) probability distribution, expectation, variance, independence, and their applications] - Commonly used distributions [Bernoulli, Binomial, Geometric, Negative Binomial, Exponential, Poisson and					
			, complex functions, and thoms of probability, condit	eir applications] ional probability, Bayes' theorem,	the total probability		

MATH2012	Fundamental concepts of mathematics (6 credits)	Academic Year	2017
Offering Department	Mathematics	Quota	
Course Co-ordinator	Dr Y M Chan (1st sem); Prof J H Lu (2nd sem), Mathematics (ymchan@maths.f	nku.hk; jhlu@math	s.hku.hk)
Teachers Involved	(Dr Y M Chan,Mathematics) (Prof J H Lu,Mathematics)		
Course Objectives	To provide students with solid background on fundamental concepts of mathem proofs. Such concepts and methods are important for subsequent studie mathematics. This course can be taken concurrently with other Level 2 or above	s in all higher le	
Course Contents & Topics	<ul> <li>Elementary set theory.</li> <li>Statement calculus.</li> <li>Mathematical proofs.</li> <li>Relations and functions.</li> <li>Finite and infinite sets.</li> <li>Natural numbers and mathematical induction.</li> <li>Real numbers and the limit of a sequence.</li> <li>Examples of groups.</li> </ul>		
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand the definition of a set and apply set theory in simple daily life CLO 2 construct the truth table of a given statement CLO 3 apply different proof strategies (e.g. proof by contradiction and mat	•	n) in proving a

	n	mathematical statement					
	CLO 4 d	lemonstrate the basic	properties of equivalence relations				
	CLO 5 understand the definition of the limit of a sequence of real numbers						
	CLO 6 demonstrate the operational properties of groups						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH1013 or MATH1821 or (MATH1851 and MATH1853)						
Offer in 2017 - 2018							
Grade Descriptors (A+ to F)	A	applications through cor	nt understanding of key concepts and ideas rectly analysing problems, clearly and elega out computations carefully and correctly, and	antly presenting correct logical reason	oning and argumentation		
	В	applications through cor	nderstanding of key concepts and ideas by rrectly analysing problems, but with some nations and presentation or with some minor of	ninor inadequacies in arguments, id			
	С	but with some inadequ	able understanding of key concepts and ide uacies in applying the theorems through er of minor computational errors.				
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.						
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
Course Type	Lecture-b	pased course					
Course Teaching	Activities		Details	Details			
& Learning Activities	Lectures			36			
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents	Tutorials and Assignments	10	CLO 1,2,3,4,5,6		
	Examina	ntion		50	CLO 1,2,3,4,5,6		
	Test			40	CLO 1,2,3,4,5,6		
Required/recommended reading and online materials	1						
Course Website	moodle.h	ıku.hk					
Additional Course Information	apply. Tutorial t http://hku	moodle.hku.hk Students with good grades in HKDSE Math Module 1 or Math Module 2 and have strong interests in math may also apply. Tutorial timetable: http://hkumath.hku.hk/~math/Timetable/tutorials1718_S1.pdf http://hkumath.hku.hk/~math/Timetable/tutorials1718_S2.pdf					

MATH2014	Multivariable calculus and linear algebra (6 credits)  Academic Y							
Offering Department	Mathema	Mathematics Quota						
Course Co-ordinator	Dr H Y Zh	ang, Mathematics (hyzł	hang@maths.hku.hk)					
Teachers Involved	(Dr H Y Z	nang,Mathematics)						
Course Objectives		e students with a solid for ly of mathematics relate	oundation in calculus of seved subjects.	eral variables and	linear algebra, wh	ich they will nee		
Course Contents & Topics	interpreta - Partial I Taylor's fo - Multiple - Matrix A - Vector S basis and - Eigenva - Numerio	<ul> <li>Vectors and Matrices: Vectors in space, dot product and cross product, determinants (with geometric interpretations).</li> <li>Partial Derivatives: Functions of several variables, partial derivatives, extreme values and Lagrange multipliers Taylor's formula.</li> <li>Multiple Integrals: Double and triple integrals, substitution in multiple integrals.</li> <li>Matrix Algebra: Matrix addition and multiplication, system of linear equations as a matrix equation.</li> <li>Vector Spaces: The Euclidean spaces as vector spaces, its subspaces, span of vectors, linear independence basis and dimension.</li> <li>Eigenvalues and Eigenvectors: Diagonalization and computing powers.</li> <li>Numerical Methods: Bisection method and Newton's method for finding roots of equations, Simpson's rule and Trapezoidal rule for numerical integration.</li> </ul>						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand the geometric meaning of partial and directional derivatives  CLO 2 optimize multivariate objective functions (with/without constraints)  CLO 3 evaluate integrals over curvilinear regions in space  CLO 4 understand the concept of vector spaces, basis, dimension  CLO 5 solve simple eigenvalue problems and apply the theory to practical problems							
Pre-requisites and Co-requisites and Impermissible combinations)	Not for st	ATH1013 or (MATH185				, or have alread		
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offer	in 2018 - 2019 : Y		Examination	Dec May		
Grade Descriptors (A+ to F)	<ul> <li>Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analyzing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.</li> <li>Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analyzing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.</li> <li>Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems,</li> </ul>							
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analyzing problems with poor argument and presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analyzing problems with poor argument or presentation or with substantial computational errors.							

	Fail	Demonstrate poor a being able to compl		being able to identify appropriate theorems or	their applications, or not
Course Type	Lecture-b	ased course			
Course Teaching	Activitie	S	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading	/ Self study			100
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examina	tion		50	CLO 1,2,3,4,5
	Test			50	CLO 1,2,3,4,5
Required/recommended reading and online materials	TBC				
Course Website	moodle.h	ku.hk			
Additional Course Information		math.hku.hk/~mat	h/Timetable/tutorials1718_S1. h/Timetable/tutorials1718_S2.		

MATH2101	l inoar	algebra I (6 cred	ite)	Academic \	ear 2017	
Offering Department	Mathematics Quota					
Course Co-ordinator			nukaha@matha hku hk)	Quota		
		•	awkaho@maths.hku.hk)			
Teachers Involved		Law,Mathematics)	l sauras an linear algebra vehich sin	as at introducing to atudout	the besis sensent	
Course Objectives	linear str	ructure through ma e to mathematical rig	I course on linear algebra, which aim ny concrete examples in the Euclide gor and prepares them for studying m	ean spaces. The course allore advanced mathematical	so enriches studen I courses.	
Course Contents & Topics	<ul> <li>Vector Geometry in R^2 and R^3: Revision of addition and scalar multiplication of vectors, dot product, lines and planes; and applications to geometry.</li> <li>Matrix Algebra: Matrix addition and multiplication, determinant and inverse of square matrices, system of linea equations as a matrix equations.</li> <li>Systems of Linear Equations: Gauss-Jordan elimination, elementary row operations, row echelon form, elementary matrices, matrix inversion.</li> <li>Vector Spaces: Coordinate system in R^n, the Euclidean spaces as vector spaces, its subspaces, span of vectors, linear independence, basis, dimension, applications.</li> <li>Linear Transformations: Definition and examples of linear transformations in R^2 and R^3, standard matrices of linear transformations.</li> <li>Eigenvalue Problem: Eigenvalues and eigenvectors, diagonalization of matrices (with distinct eigenvalues), applications.</li> <li>Inner Product: Gram-Schmidt process, least square problems.</li> </ul>					
Course Learning			this course, students should be able	to.		
Outcomes	CLO 1 h	nandle matrix operat	ions and use them in some practical near equations by Gauss-Jordan eli	problems	e inverses of squar	
	r	ion, and linear transformation eory to some practical problemethod	•			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in N	MATH1013 or MATH	11821 or (MATH1851 and MATH1853	3)		
Offer in 2017 - 2018	Y 1s	st sem 2nd sem	Offer in 2018 - 2019 : Y	Examinatio	n Dec May	
Grade Descriptors (A+ to F)	A	applications through and being able to car	ellent understanding of key concepts and idea: correctly analysing problems, clearly and eleg ry out computations carefully and correctly, an	antly presenting correct logical read with some innovative approaches	asoning and argumentati s to solving problems.	
		Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.				
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.				
		Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation of with substantial computational errors.				
	D	substantial inadequa with substantial comp	inderstanding of key concepts and ideas by b cies in applying the theorems through incorrec putational errors.	etly analysing problems with poor a	ropriate theorems, but wargument or presentation	
	D Fail	substantial inadequa with substantial comp Demonstrate poor ar	Inderstanding of key concepts and ideas by books in applying the theorems through incorrecoutational errors.  In inadequate understanding by not being able	etly analysing problems with poor a	ropriate theorems, but wargument or presentation	
Course Type	Fail	substantial inadequa with substantial comp Demonstrate poor ar being able to comple	Inderstanding of key concepts and ideas by books in applying the theorems through incorrecoutational errors.  In inadequate understanding by not being able	etly analysing problems with poor a	ropriate theorems, but wargument or presentation	
	Fail Lecture-l	substantial inadequa with substantial comp Demonstrate poor ar being able to comple based course	understanding of key concepts and ideas by bocies in applying the theorems through incorrectional errors.  Id inadequate understanding by not being able the solution.	etly analysing problems with poor a	ropriate theorems, but w rrgument or presentation or their applications, or r	
Course Teaching	Fail Lecture-l	substantial inadequa with substantial comp Demonstrate poor ar being able to comple based course	Inderstanding of key concepts and ideas by books in applying the theorems through incorrecoutational errors.  In inadequate understanding by not being able	etly analysing problems with poor a	ropriate theorems, but w regument or presentation or their applications, or r	
Course Teaching	Fail Lecture-l Activitie Lectures	substantial inadequa with substantial comp Demonstrate poor ar being able to comple based course es	understanding of key concepts and ideas by bocies in applying the theorems through incorrectional errors.  Id inadequate understanding by not being able the solution.	etly analysing problems with poor a	ropriate theorems, but wargument or presentation or their applications, or room of the section o	
Course Teaching	Fail Lecture-l Activitie Lectures Tutorials	substantial inadequa with substantial comp Demonstrate poor ar being able to comple based course	understanding of key concepts and ideas by bocies in applying the theorems through incorrectional errors.  Id inadequate understanding by not being able the solution.	etly analysing problems with poor a	ropriate theorems, but wargument or presentation or their applications, or room of their applications of Hours 36 12	
Course Teaching	Fail Lecture-l Activitie Lectures Tutorials	substantial inadequa with substantial comp Demonstrate poor ar being able to comple based course es	understanding of key concepts and ideas by bocies in applying the theorems through incorrectional errors.  Id inadequate understanding by not being able the solution.	etly analysing problems with poor a	ropriate theorems, but wargument or presentation or their applications, or room of the section o	
Course Teaching & Learning Activities  Assessment Methods	Fail Lecture-l Activitie Lectures Tutorials	substantial inadequa with substantial comp Demonstrate poor ar being able to comple based course es	understanding of key concepts and ideas by bocies in applying the theorems through incorrectional errors.  Id inadequate understanding by not being able the solution.	etly analysing problems with poor a	ropriate theorems, but wargument or presentation or their applications, or room of their applications of Hours 36 12	
Course Teaching & Learning Activities  Assessment Methods	Fail Lecture-I Activitie Lectures Tutorials Reading Methods Assignm	substantial inadequa with substantial comp Demonstrate poor ar being able to comple based course 95 6 6 7 / Self study s	understanding of key concepts and ideas by boices in applying the theorems through incorrect obtained errors.  In inadequate understanding by not being able the solution.  Details	weighting in final course grade (%)	ropriate theorems, but wargument or presentation or their applications, or their applicatio	
Course Teaching & Learning Activities  Assessment Methods	Fail Lecture-I Activitie Lectures Tutorials Reading Methods	substantial inadequa with substantial comp Demonstrate poor ar being able to comple based course 95 6 6 7 / Self study s	inderstanding of key concepts and ideas by botics in applying the theorems through incorrect putational errors.  Indicate the solution.    Details	weighting in final course grade (%)	ropriate theorems, but wargument or presentation or their applications, or their applicatio	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail Lecture-I Activitie Lectures Tutorials Reading Methods Assignm	substantial inadequa with substantial comp Demonstrate poor ar being able to comple based course 95 6 6 7 / Self study s	inderstanding of key concepts and ideas by botics in applying the theorems through incorrect putational errors.  Indicate the solution.    Details	weighting in final course grade (%)	ropriate theorems, but wargument or presentation or their applications, or their applicatio	

Course Website	moodle.hku.hk
Additional Course	Tutorial timetable:
Information	http://hkumath.hku.hk/~math/Timetable/tutorials1718_S1.pdf
	http://hkumath.hku.hk/~math/Timetable/tutorials1718_S2.pdf

MATH2102	Linear a	lgebra II (6 credits)		Academic Yea	ar 2017		
Offering Department	Mathemat			Quota			
Course Co-ordinator	Prof W Za	ng, Mathematics (wzang	g@maths.hku.hk)	' ·			
Teachers Involved	(Prof W Za	ang,Mathematics)	,				
Course Objectives	subspaces	This is a follow-up of the course Linear Algebra I. It aims at introducing the general concept of vector spaces, subspaces, dimensions, inner product spaces, etc. The course prepares the foundation on linear algebra for students' future study in mathematics and other disciplines. Many examples of applications will be drawn on					
Course Contents & Topics	1. Vector s 2. Linear determinal 3. Linear c diagonaliz 4. Inner pr 5. Linear c diagonaliz	1. Vector spaces: definition of field, subspaces/quotient spaces, direct sum, existence of basis, dual space 2. Linear transformations: kernel and image, isomorphisms, matrix representations of linear transformations, determinant 3. Linear operator: eigenvalues and eigenspaces, algebraic/geometric multiplicity, diagonalizability, Cayley-Hamilton theorem, canonical form (optional) 4. Inner product space: Inner product, orthonormal basis, orthogonal complement and projection 5. Linear operators on inner product space: adjoints of operators, orthogonal/unitary operators, orthogonal/unitary diagonalization of self-adjoint/normal operators, symmetric bilinear form and quadratic form 5. Additional selected topics up to the instructor					
Course Learning	On succes	sful completion of this c	ourse, students should be able	to:			
Outcomes	CLO 1 ide	entify vector space struc	tures and apply relevant knowle	edge to some practical problem	ns .		
	CLO 3 un	derstand the base-free	ubspaces and compute basis, on nature of linear transformation matrices by choosing particular	ons/operators. Relate the cal	culations of linear		
	CLO 4 be	able to solve eigenvalu	e problem for linear operators a	ind apply it to the problem of di	agonalization		
	CLO 5 understand the notions of inner product space and adjoints of operators. Be able to do calculation involving properties of adjoints						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ma	Pass in MATH2101 or (MATH1821 and MATH2822)					
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.						
	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.						
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.						
	D						
	Fail	Demonstrate poor and inade being able to complete the s	equate understanding by not being able	e to identify appropriate theorems or t	heir applications, or not		
Course Type	Lecture-ba	sed course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures			36			
5	Tutorials				12		
		Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination			50	CLO 1,2,3,4,5		
	Test			50	CLO 1,2,3,4,5		
Required/recommended reading and	S. Friedbe						
online materials							
	moodle.hk	u.hk					
online materials Course Website Additional Course	Tutorial tin	netable:	table/tutorials1718_S2.pdf				

MATH2211	Multivariable calculus (6 credits)	Academic Year	2017		
Offering Department	Mathematics	Quota			
Course Co-ordinator	Dr Z Hua (1st sem); Prof W S Cheung (2nd sem), Mathematics (huazheng@ma	ths.hku.hk; wsche	ung@hku.hk)		
Teachers Involved	(Dr Z Hua,Mathematics) (Prof W S Cheung,Mathematics)				
Course Objectives	Students of this course will learn the theory of multivariable calculus and learn how to apply the theory to solve practical problems. This is a required course for Mathematics and Mathematics/Physics Majors, and is suitable for all students in Science, Engineering, Economics and Finance, and other students who will use multivariable calculus in their areas of study. This is also a required course for all Minors offered by the Department of Mathematics, and is a pre-requisite of many advanced level mathematics courses.				
Course Contents & Topics	<ul> <li>Vectors: vectors in 2-, 3-, and n-dimensions; dot product and cross product; and spherical coordinates.</li> <li>Differentiation in several variables: limits and derivatives; the chain rule; directical vector-valued functions: parametrized curves; arc-length; vector fields; grad operator.</li> </ul>	onal derivatives ar	nd gradients.		

	- Maxima	and minima: differenti	als and Taylor's Theorer	n of several variables; extrema of	functions; Lagrange	
	- Multiple - Line inte	grals: scalar and vector	triple integrals; change of r line integrals; Green's Th	f variables; applications. neorem; conservative vector fields. ces; surface integrals; Stoke's and C	Squasia Theorems	
Course Learning			course, students should b		dauss's Theorems.	
Outcomes				alculus of functions in several real va	riables	
				compute line integrals and surface in		
				blems, such as constrained optimiz	ation problems and	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	iss in MATH1013 or MATH1821 or (MATH1851 and MATH1853)				
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offer	r in 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	A	applications through correct and being able to carry out	ctly analysing problems, clearly computations carefully and corr	and ideas by being able to identify the appro and elegantly presenting correct logical reas rectly, and with some innovative approaches t	oning and argumentation o solving problems.	
	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail	Demonstrate poor and inabeing able to complete the		eing able to identify appropriate theorems or	their applications, or not	
Course Type	Lecture-b	ased course				
Course Teaching	Activities	5	Details		No. of Hours	
& Learning Activities	Lectures			36		
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		10	CLO 1,2,3	
	Examinat	ion		50	CLO 1,2,3	
	Test			40	CLO 1,2,3	
Required/recommended reading and online materials	Susan J.	Colley: Vector Calculus	(Pearson, 2011, 4th edition	on)		
Course Website	moodle.hl	ku.hk				
Additional Course Information	Tutorial tir	metable: math.hku.hk/~math/Tim	etable/tutorials1718_S1.petable/tutorials1718_S2.petable/tutorials1718_S2.petable/tutorials1718_S2.p			

MATH2241	Introduc	ction to mathen	natical analy	sis (6 credit	s)	Academic Year	2017
Offering Department	Mathemat	tics				Quota	
Course Co-ordinator	Dr Y M Ch	han, Mathematics	(ymchan@mat	ths.hku.hk)			
Teachers Involved	(Dr Y M C	han, Mathematics)	·-				
Course Objectives	To introdu	ice students to the	basic ideas ar	nd techniques o	f mathematical analy	sis.	
Course Contents & Topics	<ul> <li>The real number system: the real numbers as an ordered field, supremum and infimum, the completeness axiom, denseness of the rational numbers.</li> <li>Sequences and series of real numbers: limits of sequences, properties of convergent sequences, monotone sequences and Cauchy sequences, subsequences, series, tests of convergence for series.</li> <li>Continuity of real-valued functions: properties of continuous functions, the extreme value theorem, the intermediate value theorem, uniform continuity, limits of functions.</li> <li>Differentiation: properties of differentiable functions, the mean value theorem, Taylor's theorem and its applications.</li> <li>Integration: construction of the Riemann integral using Darboux sums and Riemann sums, the fundamental theorem of calculus.</li> </ul>						
Course Learning Outcomes	CLO 1 cc CLO 2 de se CLO 3 el int CLO 4 el ur	On successful completion of this course, students should be able to:  CLO 1 comprehend and use abstract mathematical arguments such as the epsilon-delta argument  CLO 2 demonstrate convergence or non-convergence of a sequence/series using properties of convergent sequences/series  CLO 3 elucidate important properties of continuous functions such as the extreme value theorem and the intermediate value theorem  CLO 4 elucidate important properties of differentiable functions such as the mean value theorem, and to understand and apply Taylor's Theorem					
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 5 articulate the construction of the Riemann integral and its relation to differentiation  Pass in MATH1013 or (MATH1851 and MATH1853) or MATH2822.  Students are strongly recommended to have taken MATH2012 if they wish to take this course.						
Offer in 2017 - 2018	Y 1st		Offer in 2018 -			Examination	Dec May
Grade Descriptors (A+ to F)	A	abstract mathematic	al arguments, to a	apply appropriate th	ions and proof techniques leorems correctly, and to and the use of innovative	make use of those prod	of techniques in nove
	В				al notions and proof technopriate theorems correctly		

		proof techniques in novel situations. Ability to present solutions clearly and logically, and evidence of innovative ideas in solving problems are expected.						
	С		standing of the mathematical notions a eal arguments and to apply appropriate					
	D	Demonstrate some understanding of the mathematical notions taught in the course by being able to correctly identify appropriate theorems for applications and to carry out logical arguments that are leading to complete solutions.						
	Fail		Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems for applications, or able to apply the theorems correctly.					
Course Type	Lecture-b	ased course						
Course Teaching	Activitie	S	Details		No. of Hours			
& Learning Activities	Lectures			36				
	Tutorials				12			
	Reading / Self study				100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		Tutorials and Assignments	10	CLO 1,2,3,4,5			
	Examination			50	CLO 1,2,3,4,5			
	Test			40	CLO 1,2,3,4,5			
Required/recommended reading and online materials	Robert G. Bartle, Donald R. Sherbert: Introduction to Real Analysis (Wiley, 2011, Fourth Edition) Kenneth A. Ross: Elementary Analysis: The Theory of Calculus (Springer, 2013, Second Edition)							
Ullille Illateriais			moodle.hku.hk					
Course Website	moodle.h	ku.hk						

MATH2822	Mathematical methods for actuarial science II (6 credits)  Academic Ye				ear 2017		
Offering Department	Mathematics Quota						
Course Co-ordinator	Dr J T Ch	Dr J T Chan, Mathematics (jtchan@hku.hk)					
Teachers Involved	(Dr J T C	han, Mathematics	)				
Course Objectives	solid back on multiv	This course is the second of the two mathematics courses designed to provide actuarial science students with a solid background of calculus of one and several variables and an introduction to linear algebra. The course focuses on multivariable calculus and linear algebra. It aims at students with MATH1821. It can be followed by other 2000 or 3000 level mathematics courses.					
Course Contents & Topics	<ul><li>Eigenva</li><li>Quadrat</li><li>Vector s</li><li>Functior</li><li>Gradien</li><li>Taylor a</li><li>Maxima</li></ul>	<ul> <li>Matrices, systems of linear equations, determinants.</li> <li>Eigenvalues and eigenvectors, diagonalization of matrices.</li> <li>Quadratic functions and their standard forms.</li> <li>Vector spaces and subspaces.</li> <li>Functions of several variables; partial differentiation.</li> <li>Gradients and directional derivatives.</li> <li>Taylor approximation, Newton's method.</li> <li>Maxima and minima; Lagrange multipliers.</li> <li>Double and triple integrals, areas and volumes.</li> </ul>					
Course Learning Outcomes	CLO 1 ur de ar CLO 2 ur	On successful completion of this course, students should be able to:  CLO 1 understand and recognize various topics in linear algebra such as the basic arithmetic of ma determinants, systems of linear equations, eigenvalues and eigenvectors, diagonalizable matrices and dimension, and the rank-nullity theorem  CLO 2 understand and recognize various topics in functions of several variables including partial different the Hessian test for local extrema, vector-valued functions, Jacobians, the method of Lagrange multiple states are considered.					
	d	ouble/triple integra	als and the change of variable formula				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH1821. For BSc(ActuarSc) students only.						
Offer in 2017 - 2018	Y 2nd	d sem Offer in 2	2018 - 2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and thei applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.      Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate.						
	С	theorems or their applications and presentation or with some minor computational errors.  Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D	·					
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
Course Type	Lecture-h	pased course					
Course Teaching	Activitie		Details		No. of Hours		
Learning Activities	Lectures		Dotailo	Details			
	Tutorials				36 12		
					100		
Assessment Methods and Weighting	Reading / Self study  Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Fxamina	tion		50			
	Examina Test	tion	2 tests	50 50	CLO 1,2 CLO 1.2		

online materials	Steven J. Leon: Linear Algebra with Applications (Pearson Prentice Hall)
Course Website	moodle.hku.hk
Additional Course	Tutorial timetable:
Information	http://hkumath.hku.hk/~math/Timetable/tutorials1718_S2.pdf

MATH3001	Develo	pment of mathemat	ical ideas (6 credits)	Academic Y	ear 2017			
Offering Department	Mathema	atics	•	Quota				
Course Co-ordinator	TBC, Ma	thematics ()						
Teachers Involved								
Course Objectives	a deeper	o acquaint the students with the origin and growth of basic mathematical concepts. To assist the students to gain deeper insight and broader view of mathematics as a discipline and human endeavour. To provide the students ith an opportunity to write on and talk about mathematics, and to engage in independent study.						
Course Contents & Topics	students	Selected topics in the development of mathematics from ancient to modern times depending on interest of the students and the lecturer, with attention paid to the evolvement of mathematical ideas and the process of nathematical thinking and problem solving.						
Course Learning	On succe	essful completion of this	course, students should be ab	ele to:				
Outcomes	CLO 1 L	inderstand and describe	the origin and development of	f basic mathematical concepts				
			ate the intellectual and the soc academic discipline and a hum	cio-cultural aspects of mathematen endeavour	atics, and appreciate			
				ious mathematical concepts an	d ideas			
			•	ry or development of mathemat				
Pre-requisites			. MATH2211 and MATH2241	.,				
(and Co-requisites and Impermissible combinations)	1 400 1111	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	, with the transfer of the tra					
Offer in 2017 - 2018	N O	ffer in 2018 - 2019 : N		Examination				
Grade Descriptors	A		asp of the subject. Show strong anal					
(A+ to F)		Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Critical use of information from sources to draw appropriate and insightful conclusions. Actively engage in and contribute substantially and fruitfully to class discussions. Apply highly effective organizational and presentational skills.						
	В	B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Correct use of information from sources to draw appropriate conclusions. Good participation in class discussions with generally good						
	С	Mostly correct but some erroneous use of information from sources to draw appropriate conclusions. Make some but not						
	substantial fruitful contributions to class discussions. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Limited ability to use information from sources to draw appropriate conclusions. Contribute only in a limited way to fruitful and meaningful class discussions. Apply limited or barely effective							
	Fail  Fail  Organizational and presentational skills.  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Misuse of information from sources and/or unable to draw appropriate conclusions. Make little or no meaningful contributions to class discussions. Organization and presentational skills are minimally effective or ineffective.							
Course Type	Lecture-l	pased course						
Course Teaching	Activitie	es	Details		No. of Hours			
& Learning Activities	Lectures	3			36			
	Tutorials	3			12			
	Reading	/ Self study			100			
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examina	ation		50				
	Test			50				
Required/recommended reading and online materials	H. Eves Reinhart							

MATH3002	Mathematics seminar (6 credits)	Academic Year	2017			
Offering Department	Mathematics	Quota	12			
Course Co-ordinator	3C, Mathematics ()					
Teachers Involved						
Course Objectives	This is a seminar style course intended for those who have very strong interests and good ability in mathematics. Students will be given book chapters and elementary research articles for private study and then make presentations in front of the whole class. Individual meetings with the instructors will be arranged prior to their presentations. Active participation in all the discussions is expected. The aim of the course is to let students learn how to initiate self/independent study in mathematics.					
Course Contents & Topics	Topics chosen by the instructors, including chapters from books and elementary	research articles.				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 Initiate private independent study on some interesting mathematical to	opics				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH2012, MATH2101, MATH2211 and MATH2241 This course is for second year BSc students only.)					
Offer in 2017 - 2018	N Offer in 2018 - 2019 : N	Examination				
Grade Descriptors	A Demonstrate thorough grasp of the subject. Show strong analytical and critical abil	ities and logical thinki	ng, with evidence of			

(A+ to F)		original thought. Activ organizational and pres	ely engage in and contribute substantially a sentational skills.	nd fruitfully to class discussions	s. Apply highly effective		
	В		Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Good participation in class discussions with generally good contributions. Apply effective organizational and presentational skills.				
	С		Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Make some but not substantial fruitful contributions to class discussions. Apply moderately effective organizational and				
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Contribute only in a limited way to fruitful and meaningful class discussions. Apply limited or barely effective organizational and presentational skills.					
	Fail	analytical and critical	of little or no grasp of the knowledge and u abilities, logical and coherent thinking. Make le entational skills are minimally effective or ineffec	ittle or no meaningful contribution			
Course Type	Project-b	pased course					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Meeting with supervisor		meeting of the whole class for week	two hours each teaching	24		
	Reading / Self study		individual meetings with the instr	ructors	24		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Researc	ch report	written examination (30%), coursework (70%)	100			
Additional Course Information	Enrollme	ent needs instructors'	approval. This course is for second ye	ar BSc students only.			

MATH3301	Algebra	a I (6 credits)		Academic Yea	ar 2017		
Offering Department	Mathema			Quota			
Course Co-ordinator	Dr Y K La	au, Mathematics (yklau@	Dmaths.hku.hk)				
Teachers Involved	(Dr Y K L	au,Mathematics)	·				
Course Objectives	in mather	This course aims to present those fundamental topics and techniques of algebra that are finding wide applications in mathematics and the applied sciences. It is complete in itself, and may also be followed by MATH4302 Algebra II and MATH7502 Topics in Applied Discrete Mathematics.					
Course Contents & Topics	homomon - Rings: 6 domains. - Fields: 6	<ul> <li>Groups: examples of groups, subgroups, cosets, Lagrange theorem, quotient groups, normal subgroups, group homomorphisms, direct product of groups, group actions.</li> <li>Rings: examples of rings, integral domains, ideals, fields of fractions, principal ideal domains, unique factorization domains.</li> <li>Fields: definition and examples of fields.</li> <li>Polynomials: polynomial rings in one variable over fields and over the integers.</li> </ul>					
Course Learning	On succe	n successful completion of this course, students should be able to:					
Outcomes	CLO 1	write down the precise	definitions of the basic con-	cepts in the "Course Conents"			
	CLO 2	give examples for each	of the concepts in the "Co	urse Conents"			
	CLO 3 understand basic properties of groups, rings, and fields						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in N	MATH2101					
Offer in 2017 - 2018	Y 1s	t sem Offer in 2018 - 2	2019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate						
	С	but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D	substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	<b>Fail</b> Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
	ı an			ng able to identify appropriate theorems or	their applications, or not		
Course Type				ng able to identify appropriate theorems or	their applications, or not		
71		being able to complete the based course		ng able to identify appropriate theorems or	their applications, or not		
Course Teaching	Lecture-b	being able to complete the cased course	solution.	ng able to identify appropriate theorems or			
Course Teaching	Lecture-b	being able to complete the coased course	solution.	ng able to identify appropriate theorems or	No. of Hours		
Course Teaching	Lecture-b Activitie Lectures Tutorials	being able to complete the coased course	solution.	ng able to identify appropriate theorems or	No. of Hours		
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials	being able to complete the cased course es	solution.	Weighting in final course grade (%)	<b>No. of Hours</b> 36 12		
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading	being able to complete the cased course as a sign of the course as a sign of t	solution.  Details	Weighting in final	No. of Hours 36 12 100 Assessment Methods		
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading Methods	being able to complete the coased course ess s s s / Self study s enents	solution.  Details	Weighting in final course grade (%)	No. of Hours  36 12 100  Assessment Methods to CLO Mapping		
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading Methods	being able to complete the coased course ess s s s / Self study s enents	solution.  Details	Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lecture-t Activitie Lectures Tutorials Reading Methods  Assignm Examina Test To be de S. Lang: J.B. Frale I.N. Hers	being able to complete the coased course sets so	Details  Details  Details  Cructor. (Springer, 2004) bstract Algebra (Addison-Webrentice-Hall, 1996)	Weighting in final course grade (%)  10 50 40  /esley, 1989, 4th edition)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials  Course Website	Lecture-t Activitie Lectures Tutorials Reading Methods  Assignm Examina Test To be de S. Lang: J.B. Frale I.N. Hers	being able to complete the coased course passed course passed course passed in the course passed in the course in Altein: Abstract Algebra (Pagerford: Abstract Alge	Details  Details  Details  Cructor. (Springer, 2004) bstract Algebra (Addison-Webrentice-Hall, 1996)	Weighting in final course grade (%)  10 50 40	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3		

	MATH3303	Matrix theory and its applications (6 credits)	Academic Year	2017	
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Offering Department	Mathematic	CS		Quota		
Course Co-ordinator	TBC, Math	ematics ()		·	'	
Teachers Involved		U				
Course Objectives	Matrix theory has a close connection with other mathematical subjects such as linear algebra, functional analysis, and combinatorics. It also plays an important role in the development of many subjects in science, engineering, and social sciences. In this course, students will be taught the fundamentals of matrix analysis and its application to various kinds of practical problems. Mathematical software may be used in the course, so that students can learn how to use the computer to solve matrix problems.					
Course Contents & Topics	- Orthogor application: Schur's tria eigenvalue - Singular	- Eigenvalues and eigenvectors: similarities, applications on difference equations and differential equations Orthogonality: inner products and the induced norms, orthogonality of null spaces and column spaces, applications to over- or under-determined systems, least squares fit. Unitary, normal, and hermitian matrices: Schur's triangularization theorem. Variational description of eigenvalues: applications in optimization and in eigenvalue estimation Singular value decomposition: polar decomposition, pseudo inverse, spectral norm of matrices, interlacing inequalities for singular values. Jordan form and applications.				
Course Learning	On success	sful completion of this	course, students should be able to:			
Outcomes		ve a good understa envectors	anding on matrices, determinants,	linear transformations,	eigenvalues and	
		•	of similar matrices and the eigenvalue	decomposition		
		derstand the concept of	<u> </u>			
			of unitary, normal, and Hermitian matr			
	dec	composition, pseudo in	lecomposition of a matrix and apply nverse and spectral norm of matrices	,		
		•	of the Jordan blocks, Jordan matrices	and the Jordan canonica	al form of a matrix	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MA	TH2101 and MATH2 <sup>-</sup>	102			
Offer in 2017 - 2018	N Offe	r in 2018 - 2019 : N		Examination		
Grade Descriptors (A+ to F)	A	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.				
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.				
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.				
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.					
Course Type	Lecture-base	sed course				
Course Teaching	Activities		Details			
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examination	on		50	CLO 1,2,3,4,5,6	
	Test	···		50	CLO 1,2,3,4,5,6	
Required/recommended reading and	Jack L. Gol		with Applications (McGraw-Hill, 1991 vith Applications (Macmillan, 1994, 4tl	)	, 525 .,2,5,1,5,0	
online materials	Chris Rorre Roger A. H	es & Howard Anton: A lorn & Charles R. Johi	pplications of Linear Algebra (Wiley, nson: Matrix Analysis (Cambridge Uni nt Edition of Matlab (Version 4 for Mic	1984, 3rd edition) iversity Press, 1987)		

MATH3304	Introd	uction to number theory (6 credits)	Academic Year	2017			
Offering Department	Mathem	natics	Quota				
Course Co-ordinator	Dr B Ka	ine, Mathematics (bkane@maths.hku.hk)					
Teachers Involved	(Dr B Kane, Mathematics)						
Course Objectives	congrue interplay will stud problem	To provide students with basic concepts about numbers, their properties and basic knowledge on the arithmetic of congruences. The prime numbers are the building blocks of all the natural numbers under multiplication. The interplay between the multiplicative and additive properties of prime numbers is particularly interesting. The course will study further properties and the distribution of the prime numbers, and some of the longstanding open problems concerning them. Important applications of number theory to modern cryptography will also be introduced.					
Course Contents & Topics	Euclides remaind reciprod - Many be expla - Deper	-The course will begin with some basic notions in number theory, including divisibility, greatest common divisor, Euclidean algorithm, congruences, etc. It will then be followed by several fundamental theorems, such as Chinese remainder theorem, solutions of linear and polynomial congruences, Fermat's Little theorem, and the quadratic reciprocity law.  - Many well-known open problems will be introduced. Application of number theory to public key cryptography will be explained. Some current research on the prime numbers will be discussed.  - Depending on the time available, the course will cover a selection of further topics, such as the prime number theorem, sum of squares, Dirichlet's theorem on diophantine approximations, etc.					
Course Learning	On succ	cessful completion of this course, students should be able to:					
Outcomes	CLO 1	solve a system of linear congruences					
	CLO 2	solve polynomial congruences					
	CLO 3	determine the solubility of quadratic congruences by computation of the	e Legendre symbo				
	CLO 4	determine the existence of primitive roots and use them in solving som	e exponential cong	ruences			

	CLO 5	LO 5 understand the prime number theorem						
	CLO 6	understanding some	longstanding problems in number the	ory				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	Pass in MATH2101 and MATH2211						
Offer in 2017 - 2018	Y 2n	2nd sem Offer in 2018 - 2019 : Y Examination May						
Grade Descriptors (A+ to F)	A	theorems and their a reasoning and argume	ugh and coherent understanding of key conc applications through correctly analysing numb entation and being able to carry out computation	per theoretic problems, clearly posts carefully and correctly.	resenting correct logical			
	В	applications through of being able to present	understanding of key concepts and ideas by correctly analysing number theoretic problems, coherent logical reasoning and carry out compu	but with some minor errors/inaded tations carefully without major erro	uacies in arguments and			
	С	but with some inade argument and present	ptable understanding of key concepts and idea quacies in applying the theorems through indication, or with moderate computational errors.	correctly analysing problems with	weak and fragmentary			
	D	Demonstrate some superficial understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation, or with substantial computational errors.						
	<b>Fail</b> Demonstrate poor and inadequate understanding of the key concepts and ideas by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.							
Course Type	Lecture-b	ased course						
Course Teaching	Activities		Details	Details				
& Learning Activities	Lectures				36			
	Tutorials				12			
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods	<b>S</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm	ents	Tutorials and Assignments	20	CLO 1,2,3,4,5,6			
	Examina	tion		50	CLO 1,2,3,4,5,6			
	Test			30	CLO 1,2,3,4,5,6			
Required/recommended reading and online materials	Textbook	: David M. Burton: E	Elementary Number Theory (McGraw-h	Hill Higher Education, Intern	ational Edition).			
Course Website	moodle.h	ku.hk						
Additional Course	Tutorial ti	metable:						
Information	http://hku	math.hku.hk/~math/	Timetable/tutorials1718_S2.pdf					

MATH3401	Analys	is I (6 credits)			Academic Year	2017	
Offering Department	Mathema	atics			Quota		
Course Co-ordinator	Prof W S	Cheung, Mathemat	ics (wscheung@hku.hk)				
Teachers Involved	(Prof W	(Prof W S Cheung,Mathematics)					
Course Objectives		This course extends to more general situations some basic results covered in Calculus and introduces some fundamental concepts which are essential for advanced studies in mathematical analysis.					
Course Contents & Topics	complete	Basic properties of metric spaces; openness; closedness; interior; closure; derived set; boundary; compactness; completeness; continuity; connectedness; pathwise connectedness; uniform continuity; uniform convergence; Banach's fixed point theorem.					
Course Learning	On succ	In successful completion of this course, students should be able to: CLO 1 demonstrate knowledge and understanding of the basic features of mathematical analysis and point set					
Outcomes	t	topology (e.g., able to	identify objects that are topolog	gical equivalent)	,		
	C	critical way (e.g., able	I skills acquired in mathematical to determine whether a specific	function is uniform	ly continuous)		
			laterally to generate innovative counterexamples to inaccurate r			andard problems	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in I	MATH2211					
000 - 0045 0040	Y 1st sem Offer in 2018 - 2019 : Y Examination Dec						
Offer in 2017 - 2018	Y 1s	st sem Offer in 201	8 - 2019 : Y		Examination	Dec	
	A 1s	Demonstrate a thorou concepts and apply reasoning and argume Demonstrate a good applications through of	gh understanding of all concepts and in the theorems through correctly analysentation, and with some innovative approunderstanding of key concepts and ideorectly analysing problems, but with s	ideas by being able to c sing problems, clearly baches to solving probler eas by being able to ide	draw complex conne- and elegantly presens. entify the appropriate	ctions among various enting correct logical e theorems and their	
Grade Descriptors	A	Demonstrate a thorous concepts and apply reasoning and argume Demonstrate a good applications through appropriate theorems. Demonstrate an accebut with some inadec	igh understanding of all concepts and if the theorems through correctly analysentation, and with some innovative appro- understanding of key concepts and ide	ideas by being able to c sing problems, clearly baches to solving probler eas by being able to id- some minor inadequacie and ideas by being able	draw complex connection and elegantly presents.  entify the appropriates in arguments, reaset to correctly identify a	ctions among various enting correct logical e theorems and thei soning, identifying the appropriate theorems	
Grade Descriptors	В	Demonstrate a thorou concepts and apply reasoning and argume Demonstrate a good applications through appropriate theorems. Demonstrate an acce but with some inadec presentation.  Demonstrate some un	igh understanding of all concepts and if the theorems through correctly analyse entation, and with some innovative appro- understanding of key concepts and id- correctly analysing problems, but with s applications, or presentation. ptable understanding of key concepts a	ideas by being able to come sing problems, clearly baches to solving problem eas by being able to idea to minor inadequacie and ideas by being able gh incorrectly analysing to be being able to correct to the solution of th	draw complex conne- and elegantly presens.  entify the appropriates in arguments, rease to correctly identify a problems with acceptly identify a	ctions among various enting correct logical e theorems and their soning, identifying the appropriate theorems, eptable argument and ate theorems, but with	
Grade Descriptors (A+ to F)	A B C	Demonstrate a thorous concepts and apply reasoning and argume Demonstrate a good applications through appropriate theorems. Demonstrate an accebut with some inadex presentation.  Demonstrate some un substantial inadequac	igh understanding of all concepts and if the theorems through correctly analyse intation, and with some innovative appre- cunderstanding of key concepts and idea correctly analysing problems, but with sapplications, or presentation, ptable understanding of key concepts a quacies in applying the theorems through anderstanding of key concepts and ideas ies in applying the theorems through income the inadequate understanding by not being	ideas by being able to c sing problems, clearly baches to solving probler eas by being able to id- some minor inadequacie and ideas by being able gh incorrectly analysing to by being able to correc- orrectly analysing proble	draw complex conne- and elegantly presense. entify the appropriation in arguments, reast to correctly identify a problems with acce- tity identify appropriations with poor argumens.	ctions among various enting correct logical e theorems and thei soning, identifying the appropriate theorems eptable argument and the theorems, but with ent or presentation.	
Grade Descriptors (A+ to F)  Course Type	A B C D Fail	Demonstrate a thorou concepts and apply reasoning and argum Demonstrate a good applications through appropriate theorems. Demonstrate an acce but with some inaded presentation. Demonstrate some ur substantial inadequace Demonstrate poor and	igh understanding of all concepts and if the theorems through correctly analyse intation, and with some innovative appre- cunderstanding of key concepts and idea correctly analysing problems, but with sapplications, or presentation, ptable understanding of key concepts a quacies in applying the theorems through anderstanding of key concepts and ideas ies in applying the theorems through income the inadequate understanding by not being	ideas by being able to c sing problems, clearly baches to solving probler eas by being able to id- some minor inadequacie and ideas by being able gh incorrectly analysing to by being able to correc- orrectly analysing proble	draw complex conne- and elegantly presense. entify the appropriation in arguments, reast to correctly identify a problems with acce- tity identify appropriations with poor argumens.	ctions among various enting correct logical e theorems and their soning, identifying the appropriate theorems eptable argument and the theorems, but with ent or presentation.	
Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail	Demonstrate a thorou concepts and apply reasoning and argume Demonstrate a good applications through appropriate theorems, Demonstrate an acceptut with some inaded presentation. Demonstrate some ur substantial inadequac Demonstrate poor and being able to complete based course.	igh understanding of all concepts and if the theorems through correctly analyse intation, and with some innovative appre- cunderstanding of key concepts and idea correctly analysing problems, but with sapplications, or presentation, ptable understanding of key concepts a quacies in applying the theorems through anderstanding of key concepts and ideas ies in applying the theorems through income the inadequate understanding by not being	ideas by being able to c sing problems, clearly baches to solving probler eas by being able to id- some minor inadequacie and ideas by being able gh incorrectly analysing to by being able to correc- orrectly analysing proble	draw complex conne- and elegantly presense. entify the appropriation in arguments, reast to correctly identify a problems with acce- tity identify appropriations with poor argumens.	ctions among various enting correct logical e theorems and their soning, identifying the appropriate theorems eptable argument and the theorems, but with ent or presentation.	
Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail Lecture-I	Demonstrate a thorou concepts and apply reasoning and argume Demonstrate a good applications through appropriate theorems, Demonstrate an acceptut with some inaded presentation. Demonstrate some ur substantial inadequac Demonstrate poor and being able to complete based course	igh understanding of all concepts and if the theorems through correctly analysentation, and with some innovative appro- understanding of key concepts and ide- correctly analysing problems, but with s- applications, or presentation, petable understanding of key concepts a quacies in applying the theorems through inderstanding of key concepts and ideas ies in applying the theorems through inco- d inadequate understanding by not being et the solution.	ideas by being able to c sing problems, clearly baches to solving probler eas by being able to id- some minor inadequacie and ideas by being able gh incorrectly analysing to by being able to correc- orrectly analysing proble	draw complex conne- and elegantly presense. entify the appropriation in arguments, reast to correctly identify a problems with acce- tity identify appropriations with poor argumens.	ctions among various enting correct logical enterems and their soning, identifying the appropriate theorems entable argument and the theorems, but with enterems, but with enterems, but with enterems, or no enterems and enteremps and enter	
Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail Lecture-I Activitie	Demonstrate a thorou concepts and apply reasoning and argume Demonstrate a good applications through appropriate theorems. Demonstrate an acceptut with some inaded presentation. Demonstrate some ur substantial inadequac Demonstrate poor and being able to complete based course	igh understanding of all concepts and if the theorems through correctly analysentation, and with some innovative appro- understanding of key concepts and ide- correctly analysing problems, but with s- applications, or presentation, petable understanding of key concepts a quacies in applying the theorems through inderstanding of key concepts and ideas ies in applying the theorems through inco- d inadequate understanding by not being et the solution.	ideas by being able to c sing problems, clearly baches to solving probler eas by being able to id- some minor inadequacie and ideas by being able gh incorrectly analysing to by being able to correc- orrectly analysing proble	draw complex conne- and elegantly presense. entify the appropriation in arguments, reast to correctly identify a problems with acce- tity identify appropriations with poor argumens.	ctions among various enting correct logical e theorems and their soning, identifying the appropriate theorems eptable argument and the theorems, but with ent or presentation, eir applications, or no No. of Hours	
Grade Descriptors (A+ to F)  Course Type Course Teaching	A B C D Fail Lecture- Activitic Lectures Tutorials	Demonstrate a thorou concepts and apply reasoning and argume Demonstrate a good applications through appropriate theorems. Demonstrate an acceptut with some inaded presentation. Demonstrate some ur substantial inadequac Demonstrate poor and being able to complete based course	igh understanding of all concepts and if the theorems through correctly analysentation, and with some innovative appro- understanding of key concepts and ide- correctly analysing problems, but with s- applications, or presentation, petable understanding of key concepts a quacies in applying the theorems through inderstanding of key concepts and ideas ies in applying the theorems through inco- d inadequate understanding by not being et the solution.	ideas by being able to c sing problems, clearly baches to solving probler eas by being able to id- some minor inadequacie and ideas by being able gh incorrectly analysing to by being able to correc- orrectly analysing proble	draw complex conne- and elegantly presense. entify the appropriation in arguments, reast to correctly identify a problems with acce- tity identify appropriations with poor argumens.	ctions among various enting correct logical enterems and their soning, identifying the appropriate theorems entable argument and the theorems, but with enterems, but with enterems, but with enterems, or no enterems and enteremps and enter	
Grade Descriptors	A B C D Fail Lecture- Activitic Lectures Tutorials	Demonstrate a thorou concepts and apply reasoning and argume Demonstrate a good applications through appropriate theorems, Demonstrate an acce but with some inaded presentation.  Demonstrate some un substantial inadequac Demonstrate poor an being able to complete based course	igh understanding of all concepts and if the theorems through correctly analysentation, and with some innovative appro- understanding of key concepts and ide- correctly analysing problems, but with s- applications, or presentation, petable understanding of key concepts a quacies in applying the theorems through inderstanding of key concepts and ideas ies in applying the theorems through inco- d inadequate understanding by not being et the solution.	ideas by being able to coming problems, clearly baches to solving problems as by being able to ideas by being able to ideas by being able ghand ideas by being able to correctly analysing probleg able to identify approp	draw complex conne- and elegantly presense. entify the appropriates in arguments, rease to correctly identify a problems with acce ettly identify appropria ms with poor argume riate theorems or the	ctions among various enting correct logical enterems and their soning, identifying the appropriate theorems entable argument and the theorems, but with enterems, but with enterems, but with enterems, but with enterems, or no enterems enterem	
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	B C D Fail Lecture- Activitic Lectures Tutorials Reading	Demonstrate a thorouconcepts and apply reasoning and argume Demonstrate a good applications through appropriate theorems. Demonstrate an accebut with some inadex presentation.  Demonstrate some un substantial inadequace Demonstrate poor and being able to complete based course essist	gh understanding of all concepts and if the theorems through correctly analysinatation, and with some innovative approunderstanding of key concepts and ideorrectly analysing problems, but with applications, or presentation. ptable understanding of key concepts a quacies in applying the theorems through a derstanding of key concepts and ideas in applying the theorems through incomplete the solution.  Details	ideas by being able to coming problems, clearly baches to solving problems as by being able to ideas by being able to ideas by being able ghand ideas by being able to correctly analysing probleg able to identify appropriately and identify appropriately ap	draw complex conne- and elegantly presense. entify the appropriates in arguments, rease to correctly identify a problems with acce ettly identify appropria ms with poor argume riate theorems or the	ctions among various enting correct logical e theorems and their soning, identifying the appropriate theorems expended argument and the terms of the theorems, but with the correct of the terms of the	

reading and online materials	Rudin: Principles of Mathematical Analysis
Course Website	moodle.hku.hk
Additional Course	Tutorial timetable:
Information	http://hkumath.hku.hk/~math/Timetable/tutorials1718_S1.pdf

MATH3403	Function	is of a complex vari	iable (6 credits)	Academic Ye	ar 2017		
Offering Department	Mathemati	cs		Quota			
Course Co-ordinator	Prof N Mo	k, Mathematics (nmok@	)hku.hk)				
Teachers Involved		k,Mathematics)					
Course Objectives	physics. In functions a	This course is indispensable for studies in higher mathematical analysis and the more theoretical aspects of physics. In this course, the students are introduced to the fundamental concepts and properties of analytic functions and are shown how to look at analyticity from different points of view. At the same time, the techniques of solving problems without losing sight of the geometric picture are emphasized.					
Course Contents & Topics	- Analytic f - The Cauchy's - Cauchy's - Taylor's s - Laurent's - Zeros, sii	Complex number system. Analytic functions and elementary functions. The Cauchy-Riemann equations. Cauchy's theorem and its applications. Taylor's series. Laurent's series. Zeros, singularities and poles. The Residue Theorem and its applications.					
Course Learning		On successful completion of this course, students should be able to:					
Outcomes	CLO 1 rec ma CLO 2 gra for CLO 3 co	On successful completion of this course, students should be able to:  CLO 1 recognize the theory of functions of a complex variable as a rigorous and foundational subject is mathematics  CLO 2 grasp the techniques from Cauchy-Riemann equations, power series expansion and Cauchy integrated formulas to study analytic functions from different perspectives  CLO 3 compute contour integrals by calculating residues					
		al line	determine improper integrals such	as those for certain ratio	nai lunctions on the		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH2211 and MATH224	41				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems a applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argume and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the applications or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate the but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argume presentation or a number of minor computational errors.  D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, I substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or present				oning and argumentation o solving problems. riate theorems and their entifying the appropriate fy appropriate theorems, ith poor argument and priate theorems, but with		
	Fail	being able to complete the s	equate understanding by not being able to it	dentify appropriate theorems or	their applications, or not		
Course Type		sed course					
	Activities		Details				
			Details		No. of Hours		
	Lectures		Details		36		
•	Lectures Tutorials		Details		36 12		
& Learning Activities	Lectures Tutorials Reading /	Self study		Walantina in Eural	36 12 100		
& Learning Activities  Assessment Methods	Lectures Tutorials Reading / Methods	Self study	Details	Weighting in final course grade (%)	36 12 100 Assessment Methods		
& Learning Activities  Assessment Methods	Lectures Tutorials Reading /	Self study			36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4		
& Learning Activities  Assessment Methods	Lectures Tutorials Reading / Methods  Examinati Test	Self study	Details	course grade (%) 50 50	36 12 100 Assessment Methods to CLO Mapping		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Lectures Tutorials Reading / Methods  Examinati Test J. Bak & D L.V. Ahlfor K. Kodaira J.P. Gilma	on and W.P. Novinger: Com J. Newman: Complex A s: Complex Analysis (M : Introduction to Comple n, I. Kra and R.E. Rodri		course grade (%) 50 50 athematics (Springer-Ver	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		
& Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lectures Tutorials Reading / Methods  Examinati Test J. Bak & D L.V. Ahlfor K. Kodaira	on and W.P. Novinger: Com J. Newman: Complex A s: Complex Analysis (M : Introduction to Comple n, I. Kra and R.E. Rodri	Details  Inplex Variables (Dover, 2nd edition)  Analysis, Undergraduate Texts in Malegraw-Hill, 3rd edition)  ex Analysis (Cambridge)	course grade (%) 50 50 athematics (Springer-Ver	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		
& Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Lectures Tutorials Reading / Methods  Examinati Test J. Bak & J. Bak & J. L.V. Ahlfor K. Kodaira J.P. Gilma moodle.hk Tutorial tin	Self study  on  and W.P. Novinger: Com  J. Newman: Complex A  s: Complex Analysis (M  : Introduction to Comple  n, I. Kra and R.E. Rodri  u.hk  netable:	Details  Inplex Variables (Dover, 2nd edition)  Analysis, Undergraduate Texts in Malegraw-Hill, 3rd edition)  ex Analysis (Cambridge)	course grade (%) 50 50 athematics (Springer-Ver	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		

MATH3405	Differential equations (6 credits)  Academic Year 2017					
Offering Department	Mathematics Quota					
Course Co-ordinator	Dr T K Wong, Mathematics (takkwong@maths.hku.hk)					
Teachers Involved	(Dr T K Wong, Mathematics)					
Course Objectives	The standard topics in the wide field of ordinary differential equations (ODI importance to students of sciences and engineering. Our emphasis is on principand our approach is a compromise between diversity and depth.					
Course Contents & Topics	<ul> <li>Review of elementary differential equations.</li> <li>Existence and uniqueness theorems.</li> <li>Second order differential equations, Wronskian, variation of parameters.</li> <li>Power series method, Legendre polynomials, Bessel functions.</li> <li>Linear systems, autonomous systems.</li> <li>Qualitative properties of solutions.</li> </ul>					

	- The Laplace transform.  On successful completion of this course, students should be able to:					
Course Learning Outcomes				de able to: r or nonlinear) ODEs by various to		
	а	uxiliary equations,	variation of parameters, Laplac	ce transform, and series method		
			st order linear ODEs with cons own functions are no more than	stant coefficients, of which the num	ber of equations and	
			the solutions of nonlinear ODE neir phase diagrams	Es or systems of nonlinear ODEs by	studying their linear	
	CLO 4 a			quantitatively/qualitatively problems	arising from physical	
Pre-requisites (and Co-requisites and Impermissible combinations)			ATH2211) or MATH2014 or (MA	ATH1821 and MATH2822)		
Offer in 2017 - 2018	Y 2n	d sem Offer in 20	)18 - 2019 : Y	Examination	n May	
Grade Descriptors (A+ to F)	A	applications through and being able to ca	correctly analysing problems, clearly rry out computations carefully and corr	and ideas by being able to identify the appropriate and elegantly presenting correct logical reaserectly, and with some innovative approaches	soning and argumentation to solving problems.	
	В	applications through		I ideas by being able to identify the appropriate some minor inadequacies in arguments, in minor computational errors.		
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail	Demonstrate poor a	nd inadequate understanding by not b	peing able to identify appropriate theorems of	or their applications, or not	
Course Type			nd inadequate understanding by not b	being able to identify appropriate theorems of	or their applications, or not	
		Demonstrate poor a being able to completo ased course	nd inadequate understanding by not b	peing able to identify appropriate theorems of	or their applications, or not	
Course Teaching	Lecture-b	Demonstrate poor a being able to comple pased course	nd inadequate understanding by not bete the solution.	peing able to identify appropriate theorems of		
Course Teaching	Lecture-b	Demonstrate poor a being able to comple pased course	nd inadequate understanding by not bete the solution.	peing able to identify appropriate theorems o	No. of Hours	
Course Type Course Teaching & Learning Activities	Lecture-b Activitie Lectures Tutorials	Demonstrate poor a being able to comple pased course	nd inadequate understanding by not bete the solution.	peing able to identify appropriate theorems o	No. of Hours	
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials	Demonstrate poor a being able to completo passed course solds.	nd inadequate understanding by not bete the solution.	Weighting in final course grade (%)	No. of Hours 36 12	
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading	Demonstrate poor a being able to complete possed course ess.  / Self study	nd inadequate understanding by not be the solution.  Details	Weighting in final	No. of Hours 36 12 100 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading Methods	Demonstrate poor a being able to comple passed course as / Self study	nd inadequate understanding by not be the solution.  Details	Weighting in final course grade (%)	No. of Hours  36  12  100  Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading Methods Assignm Examina Test	Demonstrate poor a being able to complete possed course possed possed course possed co	nd inadequate understanding by not bete the solution.  Details  Details	Weighting in final course grade (%)  10 50 40	No. of Hours  36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lecture-b Activitie Lectures Tutorials Reading Methods  Assignm Examina Test On-line te http://aim R. Nagle 6th editio W.E. Boy edition)	Demonstrate poor a being able to complete poor assed course assed course as a second poor assed course as a second poor as a	Details  Details  Details  F. Trench: Elementary Differentapproved-textbooks/trench-de/nider: Fundamentals of Differentare: Elementary Differentare: Elementary Differental Equation 1.	Weighting in final course grade (%)  10 50 40  Itial Equations with Boundary Value Problemations and Boundary Value Problemations and Boundary Value Problematics and Boundary Value Problemat	No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4 Problems (2013) urb e Problems (Pearson,	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Lecture-b Activitie Lectures Tutorials Reading Methods  Assignm Examina Test On-line te http://aim R. Nagle 6th editio W.E. Boy edition) E.A. Code	Demonstrate poor a being able to complete poor assed course assed course as a second poor assed course as a second poor assed course as a second poor a second	Details  Details  Details  F. Trench: Elementary Differentapproved-textbooks/trench-de/ider: Fundamentals of Differentapproved-ferentapproved	Weighting in final course grade (%)  10 50 40  Itial Equations with Boundary Value Problemations and Boundary Value Problemations and Boundary Value Problematics and Boundary Value Problemat	No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4 Problems (2013) urb e Problems (Pearson,	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lecture-b Activitie Lectures Tutorials Reading Methods  Assignm Examina Test On-line te http://aim R. Nagle 6th editio W.E. Boy edition)	Demonstrate poor a being able to complete possed course possed possed course possed po	Details  Details  Details  F. Trench: Elementary Differentapproved-textbooks/trench-de/nider: Fundamentals of Differentare: Elementary Differentare: Elementary Differental Equation 1.	Weighting in final course grade (%)  10 50 40  Itial Equations with Boundary Value Problemations and Boundary Value Problemations and Boundary Value Problematics and Boundary Value Problemat	No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4 Problems (2013) url	

MATH3408		utational methods and differential equations with ations (6 credits)		Academic Year	2017			
Offering Department	Mathen	Mathematics Quota						
Course Co-ordinator	Prof W	K Ching, Mathematics (wching@hku.hk)						
Teachers Involved	(Prof W	K Ching, Mathematics)						
Course Objectives		urse covers topics in the fields of differential equations and n is students. The emphasis is practical applications of basic pri		nalysis which are	of importance to			
Course Contents & Topics	- Nume - LU fac - Matrix - Solutic - Eleme - Nume	- Solution of linear difference equations Numerical differentiation and integration LU factorization for solving linear system of equations Matrix norms and iterative solutions of matrix equations Solution of nonlinear systems of equations Elementary differential equations and power series method Numerical solutions of ordinary and partial differential equations Numerical solutions of systems of first-order ordinary differential equations.						
Course Learning Outcomes	CLO 1 CLO 2 CLO 3	resesful completion of this course, students should be able to: construct and implement numerical methods for numerical into of linear and nonlinear system of equations explain mathematical ideas of numerical methods in solving partial differential equations construct one-step and linear multistep methods for the nur ordinary differential equations and systems of such equation properties construct finite difference methods for the numerical solution their stability and accuracy properties implement numerical methods for solving initial and boundar Scilab	g linear di merical sol ns and an	ifference equation lution of initial-val alyze their stabili differential equation	us, ordinary and ue problems for ty and accuracy ons and analyze			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	(MATH2101 and MATH2211) or MATH2014 or (MATH1821 a	nd MATH2	822)				

Offer in 2017 - 2018	Y 2nd	I sem Offer in 2018 - 2	019 : Y		Examination	May
Grade Descriptors (A+ to F)	A	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and computational methods and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.				
	В	computational methods and	d their applications throu	pts and ideas by being able ugh correctly analysing probler computational methods or their	ns, but with some	minor inadequacies in
	С		s, but with some inadequ	oncepts and ideas by being abluacies in applying them throughputational errors.		
	D		t with substantial inadequ	and ideas by being able to c uacies in applying them throug tional errors.		
	Fail	Demonstrate poor and inade or their applications, or not be		not being able to identify apprope solution.	oriate theorems and	computational methods
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Reading / Self study					100
Assessment Methods and Weighting	Methods		Details		nting in final e grade (%)	Assessment Methods to CLO Mapping
	Examinat	ion			50	CLO 1,2,3,4,5
	Test				50	CLO 1,2,3,4,5
Required/recommended	D.F. Parkl	nurst: Introduction to App	plied Mathematics fo	r Environmental Science	(Springer)	
reading and	E.A. Codd	lington: An Introduction	to Ordinary Differenti	ial Equations (Prentice-Ha	all)	
online materials	A. Ralstor	and P. Rabinowitz: A F	irst Course in Nume	rical Analysis (McGraw-H	ill)	
Course Website	moodle.hk	ku.hk				
Additional Course	Tutorial tir	netable:				
Information	http://hkur	math.hku.hk/~math/Time	etable/tutorials1718_	S2.pdf		

MATH3541	Introduc	tion to topology (6	credits)	Academic Yea	ar 2017	
Offering Department	Mathemat	ics	-	Quota		
Course Co-ordinator	Dr Z Hua,	Mathematics (huazher	ng@maths.hku.hk)			
Teachers Involved						
Course Objectives	will emph	asize more on building tudents for more adva	students to fundamental knowle geometric intuition and links b anced Mathematics and Physic Piology	petween topology and other si	ubjects. It can hel	
Course Contents & Topics	Topics wil (i) Basic p (ii) Triangu (iii) Brouw	Physics, Computer Science and Biology.  Topics will be chosen among the following: (i) Basic point-set topology: topological spaces, product and quotient spaces. (ii) Triangulation, Euler characteristics, classification of graphs and surfaces. (iii) Brouwer fixed point theorem, winding number. (iv) Fundamental groups, covering spaces.				
Course Learning			course, students should be able	to:		
Outcomes	CLO 1 ui	nderstand basic constru	uctions in point-set topology			
			ter examples for concepts in "co	urse contents"		
			of fundamental groups and its ap		cation problem	
Pre-requisites (and Co-requisites and Impermissible combinations)		ATH2101 and MATH22 are recommended to ha	241. ave passed or already enrolled in	n MATH3301 and MATH3401.		
Offer in 2017 - 2018	N Off	er in 2018 - 2019 : Y		Examination		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their					
	С	applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and				
	presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or					
	with substantial computational errors.  Fail Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or no being able to complete the solution.					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	1	Details		No. of Hours	
& Learning Activities	Lectures		Dotails		36	
•	Tutorials				12	
		Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
and Weighting				10	CLO 1.2.3	
and Weighting	Assignme	ents				
and Weighting	Assignme Examinat			50	CLO 1,2,3	
and Weighting					, , -	
and Weighting Required/recommended	Examinat Test	ion		50	CLO 1,2,3	
	Examinat Test Recomme	ion		50	CLO 1,2,3	

Course Website moodle.hku.hk

MATH3600	Discret	e mathematics (6 cr	edits)	Academic Yea	r 2017			
Offering Department	Mathema	atics		Quota				
Course Co-ordinator	Dr K H L	r K H Law, Mathematics (lawkaho@maths.hku.hk)						
Teachers Involved		Or K H Law,Mathematics)						
Course Objectives	To introd	To introduce students to the basic ideas and techniques of discrete mathematics.						
Course Contents & Topics	generatir - Graph t	ng functions.	nutations, pigeonhole principle, es, connectivity, planarity, etc. ues and graph theory.	inclusion-exclusion, recurren	ce relations, and			
Course Learning	On succe	essful completion of this	course, students should be able	to:				
Outcomes	CLO 1	demonstrate knowledge a	and understanding of the basic id	leas and techniques of discrete	mathematics			
	CLO 2	solve various real-world p	problems by using counting techr	iques and graph theory				
	CLO 3	develop their ability to rea	ad, comprehend, and create matl	nematical arguments				
Pre-requisites (and Co-requisites and Impermissible combinations)			of Level 2 MATH courses) or (M (MATH1821 and MATH2822)	1ATH1851 and MATH1853 an	d any 1 of level 2			
Offer in 2017 - 2018	Y 1s	t sem Offer in 2018 - 2	019 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A							
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.							
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.							
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.							
	Fail	being able to complete the	lequate understanding by not being able solution.	to identify appropriate theorems or the	eir applications, or no			
Course Type		pased course						
Course Teaching	Activitie	es	Details	No. of Hours				
& Learning Activities	Lectures				36			
	Tutorials			12				
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		assignments, tutorials, participation, etc	10	CLO 1,2,3			
	Examina	ation		50	CLO 1,2,3			
	Test			40	CLO 1,2,3			
Required/recommended reading and online materials	Richard A	A. Brualdi: Discrete Math	ematics (Pearson)					
Course Website	moodle.h	nku.hk						
Additional Course	Tutorial t	imetable:						

MATH3601	Numerical analysis (6 credits)	Academic Year	2017				
Offering Department	Mathematics	Quota					
Course Co-ordinator	Dr Z Zhang, Mathematics (zhangzw@maths.hku.hk)						
Teachers Involved	(Dr Z Zhang, Mathematics)						
Course Objectives	This course covers both the theoretical and practical aspects of numerical analysis. Emphasis will be on basic principles and numerical methods of solution, using high speed computers.						
Course Contents & Topics	<ul> <li>Different types of errors, condition number, and convergence order.</li> <li>Polynomial interpolation and function approximation.</li> <li>Solution of equations of one variable.</li> <li>Direct and iterative methods for solving linear systems.</li> <li>Numerical differentiation and integration.</li> <li>Simple initial value problems for Ordinary Differential Equations.</li> </ul>						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 construct and implement algorithms to find the zeros of functions, ap fixed point iteration methods; and construct and implement New nonlinear equations  CLO 2 apply direct and iterative methods for solving linear equation systems  CLO 3 construct interpolation polynomials in Lagrange, Newton, Hermite an CLO 4 understand the basic numerical integration and differentiation method	ton's method to sol s d spline forms					
	CLO 5 solve initial value problems using Taylor series and Runge-Kutta methods of varying orders CLO 6 use software package such as Scilab or Matlab to solve numerical problems						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MA	ГН2822)					
Offer in 2017 - 2018	Y 1st sem Offer in 2018 - 2019 : Y	Examination	Dec				
Grade Descriptors	A Demonstrate an excellent understanding of key concepts and methods theorems/algorithms and their applications through correctly analysing problems,						

(A+ to F)	reasoning and argumentation and being able to carry out numerical procedures carefully and correctly, and with some innovative approaches to solving problems.					
	В	and their applications throu	igh correctly analysing prob	Id methods by being able to identify the appropriate of the some minor inadequacies in are minor computational errors.		
	С		th some inadequacies in ap	oncepts and methods by being able to corre- plying the theorems/methods through incorrectly nor computational errors.		
	D		th substantial inadequacies	is and methods by being able to correct in applying the theorems/methods through incorr computational errors.		
	Fail	Demonstrate poor and ina applications, or not being ab		not being able to identify appropriate theor	ems/algorithms or their	
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examinat	ion		50	CLO 1,2,3,4,5,6	
	Test			50	CLO 1,2,3,4,5,6	
Required/recommended	Instructor'	s Lecture Notes				
reading and	A. Ralstor	and P. Rabinowitz: A F	irst Course in Numerio	cal Analysis (McGraw-Hill)		
online materials	K. E. Atkir	son: An Introduction to	Numerical Analysis (W	/iley, 1989)		
Course Website	moodle.hk	u.hk				
Additional Course	Tutorial tir	netable:				
Information	http://hkur	nath.hku.hk/~math/Time	etable/tutorials1718_S	1.pdf		

MATH3603	Probabil	ity theory (6 ci	redits)		Academic Year	2017		
Offering Department	Mathemati	cs	•		Quota			
Course Co-ordinator	Dr Z Qu, M	Dr Z Qu, Mathematics (zhengqu@maths.hku.hk)						
Teachers Involved	(Dr Z Qu,N	Mathematics)	, , , , , , , , , , , , , , , , , , ,					
Course Objectives	fundament	tal principles of p	e will be on probability models and the robability theory through examples on this course to widely divergent con	and to develop the				
Course Contents & Topics	-Basic probability theory: random variable, discrete and continuous probability distributions, expectation, variance, moment generating function, strong law of large numbers, central limit theorem.  -Conditional probability theory: conditional probability, Bayes theorem, conditional expectation, conditional variance, compound random variable, Polya's urn model, Bose-Einstein statistics.  -Markov chain theory: concepts of states and transition probability, irreducibility, stationary distribution, limiting probabilities, reversibility, hidden Markov chain, applications in marketing and genetic problems, branching process, Markov decision process.  -Poisson process and reliability theory: exponential distribution, memoryless property, Poisson process, concepts of reliability, applications to server queue problems.							
Course Learning			f this course, students should be abl	e to:				
Outcomes			ognize the fundamental principles of					
	pro	blems	proofs and computational techniques edge and understanding of various ty		,	them to concrete		
Pre-requisites			edge and understanding of various ty ATH2211) or MATH2014 or (MATH1					
(and Co-requisites and Impermissible combinations)	1 433 III (IVI	ATTIZ TOT and Wi	ATTIZZ 11) OF WATTIZO 14 OF (WATTI	oz r and warrizo	22)			
Offer in 2017 - 2018	Y 1st	sem Offer in 20	18 - 2019 : Y		Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.							
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.							
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.							
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.							
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or no being able to complete the solution.							
Course Type		sed course						
Course Teaching	Activities		Details			No. of Hours 36		
& Learning Activities	Lectures							
	Tutorials	0.15.1.1				12		
	Reading /	Self study				100		
Assessment Methods and Weighting	Methods		Details		ng in final grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts	Coursework assessment		10	CLO 1,2,3		
	Examinati	on			50	CLO 1,2,3		
	Test		Two midterm tests		40	CLO 1,2,3		

Course Website	moodle.hku.hk
Additional Course	Tutorial timetable:
Information	http://hkumath.hku.hk/~math/Timetable/tutorials1718_S1.pdf

MATH3901	Operation	ons research I (6 cr	redits)	Academic Year	2017		
Offering Department	Mathemati			Quota			
Course Co-ordinator	Prof X Yua	an, Mathematics (xmyu	uan@hku.hk)				
Teachers Involved	(Prof X Yu	Prof X Yuan, Mathematics)					
Course Objectives	and its relalgorithms	lated topics in operations and applications. The	damental account of the basic resens research. There is an equal estourse serves, together with a coded studies in operations research	mphasis on all three aspects ourse on network models, as	of understanding		
Course Contents & Topics	- Duality T - Sensitivit	ty Analysis and Parame Flow Problems	etric Linear Programming				
Course Learning Outcomes	CLO 1 un		course, students should be able to ntal concept and approach of line		the further study		
	CLO 2 de	emonstrate knowledge	and understanding of the underlual simplex algorithm and the tran		x method and its		
	CLO 3 un		e theory of LP duality such as in		mes and network		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ma	Pass in MATH2014 or MATH2101 or MATH2102					
Offer in 2017 - 2018	Y 2nd	I sem Offer in 2018 -	2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.					
	B Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.						
	Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.						
	Demonstrate some understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.						
Course Type	Fail		dequate understanding by not being able to complete or compute the so		e theorems, algorithms		
Course Type Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures	,	Details		36		
a Louining / totivitio	Tutorials				12		
		Self study			100		
Assessment Methods	Methods	Och Study	Details	Weighting in final	Assessment		
and Weighting	Wethous		Details	course grade (%)	Methods to CLO Mapping		
	Assignments		Coursework assessment	10	CLO 1,2,3		
	Examinati	ion		50	CLO 1,2,3		
	Test		Two midterm tests 40		CLO 1,2,3		
Required/recommended reading and online materials	J.P. Ignizio H.A. Taha	o: Goal Programming a :: Operations Research	near Programming (Prentice-Hall and Extensions (Lexington Books, (Prentice-Hall International, 7/e 2	1976) 003)			
			ear Programming and Game Theo				
Course Website			thematical Programming (Duxbury	/ 4/E 2003)			
	<del></del>						
Additional Course		/moodle.hku.hk/ ial timetable:					

MATH3904	Introduction to optimization (6 credits)	Academic Year	2017			
Offering Department	Mathematics	Quota				
Course Co-ordinator	Prof W Zang, Mathematics (wzang@maths.hku.hk)					
Teachers Involved	(Prof W Zang, Mathematics)					
Course Objectives	This course introduces students to the theory and techniques of optimization, aiming at preparing them for further studies in operations research, mathematical economics and related subject areas.					
Course Contents & Topics	<ul> <li>Unconstrained and constrained optimization.</li> <li>Necessary conditions and sufficient conditions for optimality, convexity, duality.</li> <li>Algorithms and numerical examples.</li> </ul>					
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 demonstrate knowledge and understanding of the basic theory and technic CLO 2 solve various optimization problems encountered in practice CLO 3 understand the connection between the purely analytical character of behavior of algorithms for solving it					
Pre-requisites (and Co-requisites and Impermissible	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2	822)				

combinations)				Examination		
Offer in 2017 - 2018	Y 1s	st sem Offer in 2018 -	Dec			
Grade Descriptors (A+ to F)	A	applications through corr	ectly analysing problems, clearly	s and ideas by being able to identify the approp y and elegantly presenting correct logical reasourectly, and with some innovative approaches to	oning and argumentation	
	В	applications through corr		nd ideas by being able to identify the appropriate some minor inadequacies in arguments, ideas minor computational errors.		
	С	but with some inadequ	ble understanding of key concept acies in applying the theorem of minor computational errors.	pts and ideas by being able to correctly identifies through incorrectly analysing problems with	fy appropriate theorems, th poor argument and	
	D		in applying the theorems throug	deas by being able to correctly identify approp th incorrectly analysing problems with poor arg		
	Fail	Demonstrate poor and in being able to complete the		being able to identify appropriate theorems or	their applications, or not	
Course Type	Lecture-I	based course				
Course Teaching	Activities Details				No. of Hours	
& Learning Activities	Lectures					
	Tutorials					
	Reading / Self study				100	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	ation		50	CLO 1,2,3	
	Test			50	CLO 1,2,3	
Required/recommended reading and online materials	Instructo	structor's lecture notes				
Course Website	moodle.h	nku.hk				
Additional Course Information	. a.coa	timetable: umath.hku.hk/~math/Tii	metable/tutorials1718 S1.	pdf		

MATH3905	Queuein	g theory and simul	ation (6 credits)	Academic Y	ear 2017					
Offering Department		Mathematics Quota								
Course Co-ordinator	Dr G Han,	G Han, Mathematics (ghan@maths.hku.hk)								
Teachers Involved	(Dr G Han	G Han,Mathematics) s course introduces students to the models and theory of queueing system, as well as the technique of								
Course Objectives	This cours	se introduces students	to the models and theory of	queueing system, as well	as the technique					
	simulation	as a practical tool of ar	nalysis.							
Course Contents & Topics	- Markovia - Simulatio	Markov, birth-and-death, and Poisson processes, exponential models. Markovian queueing networks. Imbedded Markov-chain queueing models. Simulation of queueing models and discrete-event systems. ntroduction of the Monte Carlo (MC) method and Markov Chain Monte Carlo (MCMC) method.								
Course Learning	On succes	sful completion of this	course, students should be able	to:						
Outcomes			gy and nomenclature appropriat							
			and understanding of various qu							
	CLO 3 for	mulate concrete proble	ems using queueing theoretical a	pproaches						
			damental principles of simulation		lation techniques					
	CLO 5 us	e Monte Carlo method	and Markov Chain Monte Carlo	method to conduct numerica	al simulations					
Pre-requisites (and Co-requisites and Impermissible combinations)	,	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)								
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2	019 : Y	Examination	n Dec					
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.									
	B Demonstrate a good understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.									
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.									
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.  Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not									
	being able to complete the solution.									
Course Type		ised course								
Course Teaching	Activities		Details	No. of Hours						
& Learning Activities	Lectures			36						
	Tutorials				12					
	Reading /	Self study			100					
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin					
	Examination			50	CLO 1,2,3,4,5					
	Examinati	on		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						
		on		50	CLO 1,2,3,4,5					
Required/recommended reading and online materials	Test R.B. Coop S.M. Ross S.M. Ross	er: Introduction to Queor: Introduction to Probable: A Course in Simulation		981, 2nd ed.) 993, 7th ed., San Diego, Ca	lifornia)					
reading and	Test R.B. Coop S.M. Ross S.M. Ross	er: Introduction to Quet : Introduction to Probab : A Course in Simulatio man: Monte Carlo Meth	oility Models (Academic Press, 1	981, 2nd ed.) 993, 7th ed., San Diego, Ca	lifornia)					

MATH3906	Financia	al calculus (6 credits	s)	Academic Ye	ar 2017					
Offering Department	Mathemat	ics		Quota						
Course Co-ordinator	Dr S P Yu	S P Yung, Mathematics (spyung@hku.hk)								
Teachers Involved	(Dr S P Y	Or S P Yung, Mathematics) his course gives an elementary treatment for the modeling of financial derivatives, asset pricing and market risks.								
Course Objectives	from an a	This course gives an elementary treatment for the modeling of financial derivatives, asset pricing and market risks from an applied mathematician's point of view. Stochastic calculus and solution methods will be introduced.								
Course Contents & Topics	- Asset pr Black-Sch - Variation	An introduction to financial instruments: stocks, bonds, options, forward and future contracts.  Asset pricing: risk neutral relationship, no arbitrage principle. Brownian motion, stochastic calculus, Ito's Lemma, Black-Scholes model and its pricing partial differential equation.  Variations on the Black-Scholes model, American options, path dependent options. Binomial tree Models. Discrete Martingale.								
Course Learning	On succes	ssful completion of this c	ourse, students should be able to:							
Outcomes	CLO 1 ur	· · · · · · · · · · · · · · · · · · ·	y and nature of bonds, interest rate	es, forwards, futures, stoc	ks, options, and the					
	CLO 2 de	emonstrate knowledge or	n using binomial tree models to find	option prices via the risk-	neutral concept					
	CLO 3 de	escribe basic properties	of a Brownian motion and the Black	Scholes stock price mod	el					
			culus (such as Ito's Lemma) to del of options; and find a solution to this							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (N	ass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822) or STAT2601								
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	)19 : Y	Examination	Dec					
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.									
,	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.									
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.									
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.									
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.									
Course Type	Lecture-ba	ased course								
Course Teaching	Activities	3	Details		No. of Hours					
& Learning Activities	Lectures				36					
	Tutorials				12					
	Reading	Self study			100					
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping					
	Examinat	ion		50	CLO 1,2,3,4					
	Test			50	CLO 1,2,3,4					
Required/recommended reading and online materials			al Calculus (Cambridge University P ial Calculus: An Introduction to Del		ge University Press,					
	P. Wilmot		ne: The Mathematics of Financial De ive Securities (South-Western Colle		iversity Press, 1995)					
Course Website	moodle.hl		·	<u> </u>						
Additional Course	Tutorial tir	netable:								
Information	http://hkur	math.hku.hk/~math/Time	table/tutorials1718_S1.pdf							

MATH3911	Game th	eory and strategy (6 credits)		Academic Year	2017				
Offering Department	Mathemat	CS		Quota					
Course Co-ordinator	Dr K H La	v, Mathematics (lawkaho@maths.hku.i	hk)						
Teachers Involved	(Dr K H Law,Mathematics)								
Course Objectives		Game theory is the logical analysis of situations of conflict and cooperation. This course will introduce the students to the basic ideas and techniques of mathematical game theory in an interdisciplinary context.							
Course Contents & Topics	theorem; r	ntorial games and Zermelo's Theore nixed Nash equilibria. In to biology: evolutionary stable strate In to politics: Shapley-Shubik power in	gies; games in coalition form; S	hapley value.					
Course Learning Outcomes	CLO 1 ur	sful completion of this course, students derstand the basic terminology and so mpute explicitly different solution conc ply game theoretical ideas and method	lution concepts in game theory epts for some simple cooperativ						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (M	ATH2101 and MATH2211) or (MATH1	821 and MATH2822)						
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2019 : Y		Examination	May				
Grade Descriptors (A+ to F)	A	Demonstrate an excellent understanding of ke theorems and their applications through correc and being able to carry out computations caref	ctly analysing problems, clearly and ele	gantly presenting con	rect logical reasoning				
	B Demonstrate a good understanding of key concepts and ideas of Game Theory by being able to identify the appropriate								

		theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	Demonstrate an acceptable understanding of key concepts and ideas of Game Theory by being able to correctly id appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with argument and presentation or a number of minor computational errors.						
	D	Demonstrate some understanding of key concepts and ideas of Game Theory by being able to correctly identify appropriat theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures						
	Tutorials			12			
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		assignments, tutorials, participation etc	5	CLO 1,2,3		
	Examina	tion		50	CLO 1,2,3		
	Project re	eports		20	CLO 1,2,3		
	Test			25	CLO 1,2,3		
Required/recommended reading and online materials	L.C. Thor	nas: Games, Theory and	Applications (Dover Publicat	ions, 1993)	·		
Course Website	moodle.h	ku.hk					
Additional Course Information	Tutorial ti http://hku		etable/tutorials1718_S2.pdf				

MATH3943	Network	models in opera	tions research (6 credits)		Academic Year	2017			
Offering Department	Mathemat	Quota							
Course Co-ordinator	Dr Z Zhan	Dr Z Zhang, Mathematics (zhangzw@maths.hku.hk)							
Teachers Involved			·						
Course Objectives	operations application	The objective is to provide a fundamental account of the basic results and techniques of network models in operations research. There is an equal emphasis on all three aspects of understanding, algorithms and applications. The course serves, together with a course on linear programming, to provide essential concept and background for more advanced studies in operations research.							
Course Contents & Topics	- Graphs a - Trees, m - Network - Ford-Ful - Applicati	Graphs and algorithms.  Frees, matchings and paths.  Network models of transportation and assignment problems.  Ford-Fulkerson network flow theory and computation for maximum flow and minimum cost flow algorithms.  Applications to combinatorial optimization problems such as allocation, location and sequencing.  Project networks, if time permits.							
Course Learning Outcomes	On succest	successful completion of this course, students should be able to:  O 1 understand the fundamental concept and approach of graphs and network models appropriate to the further study of operations research  O 2 demonstrate knowledge and understanding of the underlying techniques of the various graph and network algorithms and their extensions  O 3 understand the theory of network flows and the duality aspects in such methods of flow computations							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (N	MATH2101 and MATI	H2211) or MATH2014; and renrolled in this course.						
Offer in 2017 - 2018	N Off	er in 2018 - 2019 : Y			Examination				
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.  B Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments,								
	identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.								
	D	Demonstrate some understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.							
	Fail		not being able to complete or compute		лиоріса, арргоріїас	ancoroma, aigorium			
Course Type	Lecture-ba	ased course							
Course Teaching	Activities	3	Details			No. of Hours			
& Learning Activities	Lectures								
	Tutorials					12			
	Reading	Self study				100			
Assessment Methods and Weighting	Methods		Details		ting in final e grade (%)	Assessment Methods to CLO Mapping			
	Examinat	ion			50	CLO 1,2,3			
	Test				50	CLO 1,2,3			
Required/recommended reading and online materials	R.K. Ahuja	a, T.L. Magnanti and	H.D. Sheral: Linear Programmir J.L. Orlin: Network Flows: Theoch: an Introduction. (7/e 2003)			993)			

moodle.hku.hk

MATH3999	Directe	d studies in mathema	atics (6 credits)	Academic Yea	r 2017					
Offering Department	Mathema	atics	<u> </u>	Quota						
Course Co-ordinator	Prof T W	Prof T W Ng, Mathematics (ntw@maths.hku.hk)								
Teachers Involved	(All teach	All teaching staff,Mathematics)  This course is designed for students who would like to have early experiences on research related independent								
Course Objectives	This coul studies.	studies.								
Course Contents & Topics	student r		will be determined by consultation by and get the approval from by							
Course Learning	On succe	essful completion of this c	ourse, students should be able to	):						
Outcomes	CLO 1	study independently a to	pic that is not available in the reg	ular curriculum						
	CLO 2	understand how mathem	natical theories are applied and/or	extended in problem-solving						
	CLO 3	gain experience in project	ct writing and oral presentation							
Pre-requisites (and Co-requisites and Impermissible combinations)	MATH4X MATH21 Subject to This caps	Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX or MATH7XXX) in the Mathematics, and Mathematics/Physics Majors, in addition to a pass in MATH2101, MATH2102, MATH2211 and MATH2241.  Subject to approval by the Department.  This capstone course is for Mathematics, and Mathematics/Physics Majors students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.								
Offer in 2017 - 2018		t sem 2nd sem Offer i	•	Examination	No Exam					
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical evaluation of information drawn from a broad range of high quality sources and to reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.									
	В									
	C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.									
	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.									
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.									
Course Type	Project-b	ased course								
Course Teaching	Activitie	s	Details		No. of Hours					
& Learning Activities	Reading	/ Self study	independent work & to attend m	eetings & seminars	120					
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping					
	Disserta	tion	Written report plus oral presentation	100	CLO 1,2,3					

MATH4302	Algebra	Algebra II (6 credits)  Academic Year   201								
Offering Department		Mathematics Quota								
Course Co-ordinator	Prof J H L	Lu, Mather	natics (jhlu@m	aths.hku.hk)		'				
Teachers Involved	(Prof J H I	Lu,Mathen	natics)	,						
Course Objectives		This course is an extension of MATH3301 and goes deeper into the various topics treated in that course. Together, the two courses are complete in themselves, and may be followed by MATH7501 and MATH7502.								
Course Contents & Topics	- Structure abelian gr	<ul> <li>- Principal ideal domains and unique factorization domains;</li> <li>- Structure theorem for finitely generated modules of principal ideal domains with applications to finitely generated abelian groups and canonical forms of matrices;</li> <li>- Field extensions; elements of Galois theory.</li> </ul>								
Course Learning	On succes	essful comp	oletion of this c	ourse, students sh	ould be able to:					
Outcomes	CLO 1 understand basic examples of principal ideal domains and why principal ideal domains are unique factorization domains									
	CLO 2 understand the classification of finitely generated modules of principal ideal domains and certain canonical forms of matrices									
	CLO 3 understand and compute splitting fields of irreducible polynomials									
	CLO 4 compute examples of Galois groups									
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M.	MATH2102	and MATH330	01						
Offer in 2017 - 2018	Y 2nd	d sem Of	ffer in 2018 - 2	019 : Y		Examination	May			
Grade Descriptors (A+ to F)	A	application	ns through correct	ly analysing problems,	clearly and elegantly prese	able to identify the appropriatenting correct logical reasoning innovative approaches to so	ng and argumentation			
	В									
	С	but with s	some inadequacie	es in applying the th	eorems through incorrectly	ng able to correctly identify a y analysing problems with				
	presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or									

	with substantial computational errors.  Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or the being able to complete the solution.									
Course Type	Lecture-based course	cture-based course								
Course Teaching & Learning Activities	Activities	Details		No. of Hours						
	Lectures			36						
	Tutorials			12						
	Reading / Self study			100						
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping						
	Assignments		10	CLO 1,2,3,4						
	Examination		50	CLO 1,2,3,4						
	Test		40	CLO 1,2,3,4						
Required/recommended reading and online materials	http://homepage.math.uiowa.edu T.W. Hungerford: Abstract Algeb	bra Abstract and Con- u/~goodman/algebrabook.dir/download ora: An Introduction (Brooks/Cole, 199 Abstract Algebra (Addison-Wesley, 198	d.htm 7, 2nd ed.)	book) url:						
Course Website	moodle.hku.hk		·							
Additional Course	Tutorial timetable:									
Information	http://hkumath.hku.hk/~math/Tin	netable/tutorials1718_S2.pdf								

	Analysis	s II (6 credits)		Academic Ye	ar  2017					
Offering Department	Mathemat	thematics Quota								
Course Co-ordinator	Dr Y M Ch	Dr Y M Chan, Mathematics (ymchan@maths.hku.hk)								
Teachers Involved	(Dr Y M Chan, Mathematics)									
Course Objectives	treatment	This course gives a comprehensive and rigorous treatment on calculus of several variables, and a modern treatment of integration theory in the language of differential forms which is essential for more advanced studies in analysis and geometry.								
Course Contents & Topics	theorem, i multipliers - Integrati partition o	Integration in R^n: Basic definitions, measure zero and content zero sets, integrability, Fubini's Theorem, partition of unity, change of variables.  Integration on chains: tensors, alternating tensors, vector fields, differential forms, Poincare Lemma, Stokes'								
Course Learning	On succes	n successful completion of this course, students should be able to:								
Outcomes	CLO 2 ap	CLO 1 demonstrate knowledge and understanding of the modern language of mathematical analysis and geometry (e.g., able to manipulate differential forms)  CLO 2 apply knowledge and skills acquired in mathematical analysis to analyze and handle novel situations in a critical way (e.g., able to determine the differentiability and integrability of specific functions)  CLO 3 think creatively and laterally to generate innovative solutions to novel problems (e.g., able to do integration)								
Ora raquialtas	Pass in M	specific functions or	i Citaliis)							
Pre-requisites and Co-requisites and Impermissible combinations)	Pass III IVI	A103401								
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018	3 - 2019 : Y	Examination	May					
Grade Descriptors (A+ to F)	B C	applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and								
				Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.						
	D	Demonstrate some und substantial inadequacie	derstanding of key concepts and ideas by bes in applying the theorems through incorrec		th poor argument and priate theorems, but wit					
	D Fail	Demonstrate some und substantial inadequacie with substantial comput	derstanding of key concepts and ideas by b se in applying the theorems through incorrec tational errors. inadequate understanding by not being able	tly analysing problems with poor arg	th poor argument and oriate theorems, but wit ument or presentation of					
	Fail Lecture-ba	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete ased course	derstanding of key concepts and ideas by b se in applying the theorems through incorrec tational errors. inadequate understanding by not being able the solution.	tly analysing problems with poor arg	th poor argument and oriate theorems, but wit ument or presentation of their applications, or no					
Course Teaching	Fail Lecture-ba	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete ased course	derstanding of key concepts and ideas by b se in applying the theorems through incorrec tational errors. inadequate understanding by not being able	tly analysing problems with poor arg	th poor argument and oriate theorems, but wit ument or presentation of their applications, or no No. of Hours					
Course Teaching	Fail Lecture-ba Activities Lectures	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete ased course	derstanding of key concepts and ideas by b se in applying the theorems through incorrec tational errors. inadequate understanding by not being able the solution.	tly analysing problems with poor arg	th poor argument and oriate theorems, but wit ument or presentation of their applications, or not their applications, or not the state of the state					
Course Teaching	Fail Lecture-ba Activities Lectures Tutorials	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete ased course	derstanding of key concepts and ideas by b se in applying the theorems through incorrec tational errors. inadequate understanding by not being able the solution.	tly analysing problems with poor arg	th poor argument and oriate theorems, but with urment or presentation of their applications, or not their applications, or not their applications, or not their applications, and their applications, and their applications, and their applications are not their applications, and their applications are not their applications and their applications are not the not their applications are not the not their applications are not the					
Course Teaching & Learning Activities	Fail Lecture-ba Activities Lectures Tutorials	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete ased course	derstanding of key concepts and ideas by b se in applying the theorems through incorrec tational errors. inadequate understanding by not being able the solution.	tly analysing problems with poor arg	th poor argument an oriate theorems, but with ument or presentation their applications, or n					
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-ba Activities Lectures Tutorials	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete assed course	derstanding of key concepts and ideas by b se in applying the theorems through incorrec tational errors. inadequate understanding by not being able the solution.	tly analysing problems with poor arg	th poor argument and oriate theorems, but with urment or presentation of their applications, or not their applications, or not their applications, or not their applications, and their applications, and their applications, and their applications are not their applications, and their applications are not their applications and their applications are not the not their applications are not the not their applications are not the					
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-ba Activities Lectures Tutorials Reading	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete assed course	derstanding of key concepts and ideas by bas in applying the theorems through incorrectational errors. inadequate understanding by not being able the solution.  Details	e to identify appropriate theorems or  Weighting in final	th poor argument and oriate theorems, but wit ument or presentation of their applications, or not					
Course Teaching Learning Activities Assessment Methods	Fail Lecture-ba Activities Lectures Tutorials Reading Methods	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete assed course	derstanding of key concepts and ideas by bas in applying the theorems through incorrectational errors. inadequate understanding by not being able the solution.  Details	weighting in final course grade (%)	th poor argument and oriate theorems, but wit ument or presentation of their applications, or not see their applications, or					
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail Lecture-ba Activities Lectures Tutorials Reading Methods  Examinat Test Apostol: Munkres: Rudin: Pri	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete assed course	derstanding of key concepts and ideas by bes in applying the theorems through incorrectational errors. inadequate understanding by not being able the solution.    Details   Details	weighting in final course grade (%)	nite theorems, but with unent or presentation of their applications, or not					
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and conline materials  Course Website	Fail Lecture-ba Activities Lectures Tutorials Reading Methods  Examinat Test Apostol: Munkres: Rudin: Pri	Demonstrate some und substantial inadequacie with substantial comput Demonstrate poor and being able to complete ased course  / Self study  / Self study  // Self study	derstanding of key concepts and ideas by bes in applying the theorems through incorrectational errors. inadequate understanding by not being able the solution.    Details   Details	weighting in final course grade (%)	nite theorems, but with unent or presentation of their applications, or not					

MATH4404 Functional analysis (6 credits)	Academic Year 2017
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Offering Department	Mathemati	ics		Quota						
Course Co-ordinator	Dr T K Wo	T K Wong, Mathematics (takkwong@maths.hku.hk)								
Teachers Involved	(Dr T K Wo	or T K Wong, Mathematics)								
Course Objectives		This course introduces students to the basic knowledge of linear functional analysis, an important branch of modern analysis.								
Course Contents & Topics	dimension - Inner pro series rela Riesz's rep - Fundame theorem, u	Normed spaces, Banach spaces: Finite dimensional normed spaces and subspaces. Compactness and finite limension. Bounded linear operators. Normed spaces of operators, dual space.  Inner product spaces, Hilbert spaces: Orthogonal complements, direct sums. Orthonormal sets and sequences, eries related to orthonormal sets and sequences. Total orthonormal sets and sequences. Special polynomials. Riesz's representation theorem. Adjoint operator, self-adjoint, normal and unitary operators.  Fundamental theorems for normed and Banach spaces: Hahn-Banach theorem. Reflexive spaces. Category neorem, uniform boundedness principle. Open mapping theorem. Closed graph theorem.  Spectral theory of linear operators.								
Course Learning Outcomes	CLO 1 co sp an CLO 2 un the CLO 3 dis	On successful completion of this course, students should be able to:  CLO 1 compare and contrast (i) finite and infinite dimensional linear spaces, (ii) complete and incomplete linear space, and (iii) normed and inner product spaces; in particular, recognize the importance of completeness and discuss how vectors are represented in these spaces  CLO 2 understand the notions of Banach spaces and Hilbert Spaces. State and apply fundamental theorems these spaces  CLO 3 discuss the dual spaces of some standard Banach spaces  CLO 4 discuss the boundedness of linear operators and the spectra of special linear operators								
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ma	ATH2101, MATH2102,	MATH2211, MATH2241 and	MATH3401						
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	2019 : Y	Examination	May					
Offer in 2017 - 2018 Grade Descriptors (A+ to F)	B C	applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.								
	presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.									
	Fail	Demonstrate poor and inaction being able to complete the		able to identify appropriate theorems or	their applications, or not					
Course Type	Lecture-ba	ased course	Soldaon.							
Course Teaching	Activities		Details		No. of Hours					
& Learning Activities	Lectures	•	Dottalis		36					
•	Tutorials				12					
	Reading /	Self study			100					
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping					
	Assignme	ents		10	CLO 1,2,3,4					
	Examinati	ion		50	CLO 1,2,3,4					
	Test			40	CLO 1,2,3,4					
Required/recommended reading and online materials	Erwin Krey	yszig: Introductory Fund	ctional Analysis with Applicati	ons (John-Wiley and Sons, 1978	3)					
Course Website	moodle.hk	u.hk								
Course website										
Additional Course Information	Tutorial tin		etable/tutorials1718 S2.pdf							

MATH4406	Introduc	ction to partia	al differential	equations (6	credits)	Academic Year	2017		
Offering Department	Mathemati	Mathematics Quota							
Course Co-ordinator	Dr H Y Zha	nang, Mathemat	cs (hyzhang@r	maths.hku.hk)					
Teachers Involved	(Dr H Y Zh	hang,Mathemat	ics)						
Course Objectives	This course introduces students to the basic techniques for solving partial differential equations as well as the underlying theories.								
Course Contents & Topics	eigenvalue characteris - Green's f - Maximum	e problems. Se istic method. function, generam principle, exis	eparation of value alized functions tence, uniquent	riables, Fourier and fundament ess and continu	tial differential equati series, linearity and al solutions. ous dependence on o method, nonlinear pa	superposition, Duh	namel's principle		
Course Learning Outcomes	CLO 1 ap	nderstand the b	calculus, linear	r algebra, mathe artial differentia	I be able to: ematical analysis in a equations and the mons to physical science	ethods to solve then	n .		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MA	IATH2101, MAT IATH3405, or al	H2102, MATH2	2241; and	ons to physical scient	ocs and origineering			
Offer in 2017 - 2018	Y 1st s	sem Offer in 2	2018 - 2019 : Y			Examination	Dec		
Grade Descriptors (A+ to F)	Α	applications throu	igh correctly analys	sing problems, clear	s and ideas by being able ly and elegantly presentin orrectly, and with some inr	g correct logical reasonin	g and argumentation		

	B C D	applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation	tly analysing problems, as and presentation or was be understanding of key es in applying the than minor computational er anding of key concepts applying the theorems hal errors.	and ideas by being able to correctly identify appropriately analysing problems with poor arg	lentifying the appropriate fy appropriate theorems, ith poor argument and oriate theorems, but with ument or presentation or			
	Fail	ail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their being able to complete the solution.						
Course Type	Lecture-ba	sed course						
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Lectures			36				
	Tutorials			12				
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examinati	on		50	CLO 1,2,3			
	Test							
Required/recommended reading and online materials	D. Bleecke	V.A. Strauss: Partial Differential Equations: An Introduction, 2nd ed. (Wiley)  D. Bleecker & G. Scordas: Basic Partial Differential Equations (International Press)  C. Evans: Partial Differential Equations (American Mathematical Society)						
Course Website	moodle.hk		·	· ·				
Additional Course Information	Tutorial tim	netable: nath.hku.hk/~math/Time	etable/tutorials1718	_S1.pdf				

MATH4501	Geometr	ry (6 credits)		Academic Y	ear 2017				
Offering Department	Mathemat	ics		Quota					
Course Co-ordinator	Dr C W W	Or C W Wong, Mathematics (cwwongab@hku.hk)							
Teachers Involved	(Dr C W W	/ong,Mathematics)	,						
Course Objectives	which we thinking. Ir surfaces ir	As geometric forms often appear in nature, the study of geometry helps us to understand better the universe in which we live. Moreover, geometry has much intrinsic beauty and the study of it is an excellent training in intuitive hinking. In this course we study the differential geometry of curves and surfaces in 3-space. In the study of regular surfaces in 3-space we exhibit geometric notions that are definable in terms of metrical properties of these surfaces alone, leading to the intrinsic geometry of surfaces.							
Course Contents & Topics		Plane and space curves, regular surfaces in three-dimensional Euclidean space. The Gauss map, Gaussian and mean curvatures, Gauss's Theorema Egregium, Gauss-Bonnet Theorem.							
Course Learning	On succes	sful completion of the	his course, students should b	e able to:					
Outcomes	CLO 1	understand the	fundamental theorems on cu	rves					
	CLO 2	compute the Ga	aussian and mean curvatures						
	CLO 3	understand the	basics of intrinsic geometry of	of surfaces					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (N	ss in (MATH2101 and MATH2211); and ss in (MATH3401 or MATH3403 or MATH3405). udents are strongly recommended to have taken MATH3405.							
Offer in 2017 - 2018	Y 1st	1st sem Offer in 2018 - 2019 : Y Examination Dec							
Grade Descriptors	Α								
(A+ to F)		applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.							
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.							
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.							
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation o with substantial computational errors.							
	Pail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or no being able to complete the solution.								
Course Type	Lecture-ba	ased course							
Course Teaching	Activities	<b>;</b>	Details		No. of Hours				
& Learning Activities	Lectures								
	Tutorials				12				
	Reading /	Self study			100				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Examination			50	CLO 1,2,3				
	Test			50	CLO 1,2,3				
Required/recommended reading and online materials	M P Do Ca	armo: Differential Ge	eometry of Curves and Surfa	ces (Prentice-Hall, 1976)					
Course Website	moodle hk	u.hk/							
Additional Course		noodle.hku.hk/ Tutorial timetable:							

MATH4511	Introduction to differentiable manifolds (6 credits)	Academic Year	2017
Offering Department	Mathematics	Quota	
Course Co-ordinator	TBC, Mathematics ()		

Teachers Involved	_								
Course Objectives	The course aims at introducing students to the notion of differentiable manifolds and basic concepts and tools for their study. The course also aims at presenting concrete examples that are relevant to further fields of study.								
Course Contents	- Review on functions of several variables, inverse mapping theorem, implicit function theorem.								
& Topics			nitions and examples.						
			bmanifolds. Differential form	s and exterior differentiation.					
		tion on manifolds.	i	_					
	- The tangent bundle, distributions and Frobenius Theorem.								
Course Learning		Further topics.  On successful completion of this course, students should be able to:							
Outcomes	CLO 1 s		of differentiable manifolds s	such as that of vector fields, differ	ential forms, vector				
	CLO 2 p			manifolds and carry out explicit c	alculations on such				
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in MATH3401 (having taken MATH4501 would be helpful; the course can also be taken concurrently with MATH4402).							
Offer in 2017 - 2018	N O	N Offer in 2018 - 2019 : Y Examination							
Grade Descriptors	A								
(A+ to F)	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.								
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.							
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.							
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.							
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.								
Course Type	Lecture-l	pased course							
Course Teaching	Activitie	es	Details		No. of Hours				
& Learning Activities	Lectures	3			36				
	Tutorials	3			12				
	Reading	/ Self study			100				
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignm	nents		10	CLO 1,2				
	Examina	ation		50	CLO 1,2				
	Test			40	CLO 1,2				
Required/recommended reading and online materials			o differential manifolds and R mooth manifolds (Springer, 2	tiemannian Geometry (Academic Pr 2002)	ess, 2002, 2nd Ed.)				

MATH4602	Scientifi	fic co	mputing (6	credits)					Academic Yea	r   20	)17
Offering Department	Mathemat	Mathematics Quota									
Course Co-ordinator	Dr Z Zhan	ing, Ma	thematics (z	hangzw@.	maths.hki	ı.hk)					
Teachers Involved	(Dr Z Zha	ang,Ma	thematics)								
Course Objectives	computati differentia	This course introduces mathematical theories and computational techniques for solving various kinds of matr computation problems, ordinary differential equations (ODEs), partial differential equations (PDEs), and stochast differential equations (SDEs) that are often encountered in scientific or industrial applications.  In addition, this course will introduce some recent development in scientific computing, such as Monte Carl						and stochasti			
Course Contents & Topics	The matri including computati Theorem; The PDE Some sel differentia	rix com g LU de tions in n; Singu E parts i elected ial equa	nputation par ecomposition including the ular values de include finite topics: Mon ation (SDE) a	t covers b n, splitting power me ecompositi difference te Carlo n rising from	asic meti method thod and on and its and finite nethod, Conmathem	nods such (Jacobi ite QR iterati application e element f	as direct eration, Ga on; spectr on in data a for elliptic/p ee Carlo m	and iterativauss-Seidel auss-Seidel al radius, S analysis. parabolic/hy	e solution of lar iteration); eiger schur's Theorem rperbolic equation numerical meth	nvalu and	ie and vector
			a significant								
Course Learning	On successful completion of this course, students should be able to:  CLO 1 apply direct method in solving a linear system										
Outcomes	CLO 1										
	CLO 2		alyze the cor								
	CLO 3		e a proof for					orem			
	CLO 4 apply iterative methods in solving a linear system										
	CLO 5		mpute the sir	ngular valu	es of a m	atrix					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	<b>МАТНЗ</b>	601								
Offer in 2017 - 2018	Y 2nd	nd sem	Offer in 20	18 - 2019	: N				Examination	M	ay
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems an numerical algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logic reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative					ing correct logical					

		approaches to solving proble	ems.				
	В	algorithms and their applic	cations through correctly	y analysing problems	ble to identify the appropriate , but with some minor inad applications and presentati	lequacies in arguments,	
	С		but with some inadequ	acies in applying the	being able to correctly ident m through incorrectly analys		
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems and numerical algorithms, but with substantial inadequacies in applying them through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail	ail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems and numerica their applications, or not being able to complete the solution.					
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details			No. of Hours	
& Learning Activities	Lectures					36	
	Tutorials					12	
	Reading / Self study					100	
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examination				50	CLO 1,2,3,4,5	
	Test				50	CLO 1,2,3,4,5	
Required/recommended reading and online materials	Charles F James W Paul Glas Peter E. k K.W. Mo	. Heath: Scientific Comp . Van Loan: Introduction . Demmel: Applied Num serman: Monte Carlo Mo (loeden and Eckhard Pla ton, D.F. Mayers, Bill I April 1st 2005 by Camb	to Scientific Computerical Linear Algebrethods in Financial I aten: Numerical Solu Morton, Numerical	uting, Matlab Curri ra, SIAM, 1 Aug 19 Engineering, Sprir ution of Stochastic Solution of Parti	997 nger New York, 19 Nov Differential Equations	2010	
Course Website	moodle.h	ku.hk					
Additional Course	Tutorial ti	metable:					
Information	http://hku	math.hku.hk/~math/Time	etable/tutorials1718	S2.pdf			

MATH4902	Operation	ons research II (6	credits)	Academic Ye	ar 2017		
Offering Department	Mathemat	tics	·	Quota			
Course Co-ordinator	Dr G Han	, Mathematics (ghan@	@maths.hku.hk)				
Teachers Involved							
Course Objectives	dynamic paspects o	orogramming (DP) an falgorithms as well as	d Markov decision processes applications. The course se	sic results and techniques of integres (MDP) in operations research. Trves, together with courses on line and algorithms for more advanced signs.	here is emphasis of ar programming an		
Course Contents & Topics	<ul> <li>Integer programming and heuristics.</li> <li>Dynamic programming (deterministic/stochastic).</li> <li>Markov decision process (discounted/average costs).</li> </ul>						
Course Learning		. ,	s course, students should be	able to:			
Outcomes	CLO 1 ur ar	CLO 1 understand the terminology and nomenclature appropriate to integer programming, dynamic programmi and Markov decision process					
	de	ecision process	, , ,	r programming, dynamic program			
			<u> </u>	ty of problems in operations resea	rcn		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH2101 and MATH2211; and Pass in MATH3901, or already enrolled in this course.						
Offer in 2017 - 2018	N Off	er in 2018 - 2019 : Y		Examination			
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.  B Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments,						
	identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.						
	D Demonstrate some understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.						
	Fail	or their applications, or n	adequate understanding by not being able to complete or compute	ng able to identify basic principles, appropre the solution.	ate theorems, algorithms		
Course Type	Lecture-b	ased course					
Course Teaching	Activities	8	Details		No. of Hours 36		
& Learning Activities	Lectures						
	Tutorials				12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinat	ion		50	CLO 1,2,3		
	Test			50	CLO 1,2,3		
Required/recommended reading and			and Theory of Dynamic Prog esses (COMAP, Inc. 1983)	ramming (Academic Press, 1977)			

online materials	G.L. Nemhauser and L.A. Wolsey: Integer and Combinatorial Optimization (Wiley, 1988)
Course Website	moodle.hku.hk

MATH4907	Numeric	al methods for fina	ncial calculus (6 credits)	Academic Year	2017			
Offering Department	Mathematics			Quota				
Course Co-ordinator	Dr C W W	or C W Wong, Mathematics (cwwongab@hku.hk)						
Teachers Involved	(Dr C W Wong, Mathematics)							
Course Objectives	arisen fron	n financial derivatives a		·	•			
Course Contents & Topics	- Numerica	<ul> <li>Introduction to the mathematical theory of vanilla and exotic options, both the PDE and the Martingale approach.</li> <li>Numerical methods for Black-Scholes pricing differential equations and their performance analyses.</li> <li>Lattice methods, Monte Carlo simulations and their performance analyses.</li> </ul>						
Course Learning			course, students should be able					
Outcomes		emonstrate knowledge a ancial derivatives	and understanding of the martir	gale theory in option pricings a	as well as related			
			arious numerical methods on the					
		derstand the connection choics pricing differentia	n between the binomial tree met il equation	hod and the finite difference me	ethod of the Black			
	CLO 4 im	plement and analyse M	onte Carlo simulation methods of	on the martingale pricing formul	a			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ass in MATH3906 or equivalent.						
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : Y		Examination				
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.							
	В							
	С							
	D							
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	<b>S</b>	Details		No. of Hours			
& Learning Activities	Lectures				36			
	Tutorials				12			
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examination			50	CLO 1,2,3,4			
	Test			50	CLO 1,2,3,4			
Required/recommended reading and online materials	Alison Eth Wilmott, D Financial I	. Strikwerda: Finite Difference Schemes and PDEs (Wadsworth & Brooks, 1989)  Alison Etheridge: A Course in Financial Calculus (Cambridge University Press)  Vilmott, Dewynne and Howison: Option Pricing: Mathematical Models and Computation (Latest Edition) (Oxford Financial Press)						
Course Website			nods in Financial Engineering (L	atest Euition) (Springer-Verlag)				
Course Website Additional Course		dle.hku.hk/						
Additional Course Information	Tutorial tir		atable/tutorials1718 S2 adf					
iiiioiiiauoii	THUP.//HKUI	ttp://hkumath.hku.hk/~math/Timetable/tutorials1718_S2.pdf						

MATH4910	Senior mathematics seminar (6 credits)	Academic Year	2017				
Offering Department	Mathematics	Quota	12				
Course Co-ordinator	Prof W S Cheung, Mathematics (wscheung@hku.hk)						
Teachers Involved	(Dr Z Hua,Mathematics) (Prof W S Cheung,Mathematics)						
Course Objectives	This seminar style capstone course aims to provide students with the exp articles and book chapters, followed by group discussions through which kno be attained. Students will look at particular mathematical topics in depth, reading, listening, discussing and writing.	owledge acquisition a	and synthesis will				
Course Contents & Topics	This seminar course may be in the form of research seminar, reading seminar seminar provides first-hand research experience to students, who will disc brought about by the readings, and the difficulties they encounter in the involves discussions on arguments delivered by the authors of books of arguments are. Participants will experience the process of argumentation in development of research idea. Student performance is manifested in their responsiveness to comments and overall engagement in the seminar. The written report and oral presentations. Topics will be chosen by the instructor chapters.	cuss the advancement research process. It or articles, and how in the construction of preparedness, qual end product is a re-	ent of knowledge Reading seminar convincing the f knowledge and ity of comments, esearch paper or				
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 explain and discuss the contents of the topics they studied  CLO 2 critique and argue about the ideas and theories of the work they studied  CLO 3 organize and synthesize the material they have learned, and report orally and in writing using mathematical language						
Pre-requisites	Pass in at least 24 credits of advanced level disciplinary core/elective	mathematics course	es (MATH3XXX,				

(and Co-requisites and Impermissible combinations)	MATH340 Subject to This caps	01, and MATH3403.  o approval by the Depart tone course is for Mathe	ematics, and Mathematics/Physics Major	rs students only.	ding MATH3301,		
Offer in 2017 - 2018		est that a student is allow er in 2018 - 2019 : Y	ved to take this capstone course is their	Examination			
Grade Descriptors (A+ to F)	A	Demonstrate an excellent analyses and raising critical	understanding of the material by lucid exposit points in group discussion. Demonstrate clear are through writing and oral presentation using mather	ion. Engage constructively b			
	В	discussion most of the time	erstanding of the material by mostly clear and by providing helpful points and asking question: sis, synthesis, and application of the knowled	s that advance the discussion	. Demonstrate mostly		
	С						
	D	limited useful contribution to	mited understanding of the material by partially e o group discussion. Demonstrate limited or barely and oral presentation using mathematical languag	effective analysis, synthesis,			
	Fail						
Course Type	Project-ba	ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Meeting with supervisor		Seminars: Students take turns to give whole class; group discussions.	presentations to the	36		
	Reading / Self study		Reading material and preparation for discussions; writing of reports/research		100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Dissertat	ion	Based on class participation and group discussions.	20	CLO 1,2,3		
	Oral pres	entation	Seminar presentations.	30	CLO 1,2,3		
	Research report		Written report / research paper: Individual and/or group reports/research papers totally no more than 10,000 words.	50	CLO 1,2,3		
Required/recommended reading and online materials	TBC						
Course Website	http://mod	odle.hku.hk/					

MATH4911	Mathem	natics capstone p	project (6 credits)	Academic Yea	r 2017			
Offering Department	Mathema	athematics Quota						
Course Co-ordinator	Dr S P Yı	ung, Mathematics (s	pyung@hku.hk)					
Teachers Involved		ung,Mathematics)	· · ·					
Course Objectives			students an experience of engal knowledge they have acquire	gaging in a project which requires d.	integration and/or			
Course Contents & Topics	of this ca students. corporate analysis, problem portfolio,	Students will work collaboratively in small groups on a project under the guidance of their supervisor(s). Emphasis of this capstone project is on the integration and/or application of mathematical knowledge acquired by the students. The project topic is not limited to academic context, but can also be extended to a community or corporate outreach project. Projects may take the form of a combination of literature research, survey, data analysis, creation of artifacts or media contents, exhibition, public lectures, development of solution plan for the problem under study, etc. Assessment may take the form of written report, oral presentation, media production, portfolio, and/or peer evaluation, etc. Topics are either chosen by the supervisor(s), or proposed by the students and approved by their supervisor(s).						
Course Learning	On succe	able to:						
Outcomes	CLO 1 in	ntegrate and apply m	athematical knowledge they have	ve previously acquired				
	CLO 2 work collaboratively with others							
	CLO 3 communicate their project topic to experts and/or lay audiences through suitable media using appropriate mathematical terms and language							
Pre-requisites (and Co-requisites and Impermissible combinations)	MATH4X Subject to This caps (This cou	XX, or MATH7XXX) o approval by the De stone course is for M	in the Mathematics, and Mather partment. athematics, and Mathematics/P					
Offer in 2017 - 2018		t sem Offer in 2018	3 - 2019 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	A Demonstrate excellent and creative integration and/or application of the mathematical knowledge previously acquired. Take initiative in, and collaborate highly effectively on, the project. Communicate effectively through suitable media using appropriate mathematical terms and language.							
	B Demonstrate good integration and/or application of the mathematical knowledge previously acquired. Participate actively in, and collaborate mostly effectively on, the project. Communicate mostly effectively through suitable media using appropriate mathematical terms and language.							
	С							
	D Demonstrate some partial integration and/or application of the mathematical knowledge previously acquired. Demonstrate barely effective collaboration on the project. Show limited ability to effectively communicate using mathematical terms and language.							
	Fail Demonstrate weak or poor integration and/or application of the mathematical knowledge previously acquired. Show passive participation in, and ineffective collaboration on, the project. Communicate ineffectively using mathematical terms and language.							
			enective collaboration on, the project. Co	on in a mone of the state of th	al terms and language.			
Course Type Course Teaching	Project-ba	ased course	enective collaboration on, the project. Co	ommunicate menecuvery using mathematica	al terms and language.			

	Meeting with supervisor	or to discuss their progress.		20	
	Assessment	Project work: Students work on their pr	roject	130	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Dissertation	Coursework assessment: Based on participation and collaboration throughout the whole project.	20	CLO 1,2,3	
	Oral presentation	Oral presentation components of the project may include seminars, lectures, oral reports, audio recordings, etc.	30	CLO 1,2,3	
	Research report	Written report / media production: This part may include written reports, booklets, exhibition materials, video productions, computer software, etc.	50	CLO 1,2,3	
Required/recommended reading and online materials	TBC				
Course Website	http://moodle.hku.hk/				

MATH4966	Mathema	atics internship (6 c	redits)	Academic Yea	ar 2017				
Offering Department	Mathemati		•	Quota					
Course Co-ordinator	Dr T K Wo	ong, Mathematics (takkw	ong@maths.hku.hk)						
Teachers Involved		All teaching staff,Mathematics)							
Course Objectives	study. The gained in t	This course aims to offer students the opportunities to gain work experience in the industry related to their major o study. The workplace learning experience would be of great benefits to the students to apply their knowledge gained in the study to the real work environments. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the department.							
Course Contents & Topics	various tas	Vithin the university: each student will be supervised by a staff member (supervisor), working on a project arious tasks as instructed by the supervisor.  Putside the university: each student will carry out approved work under the guidance and supervision of a							
Course Learning	external su		course, students should be able to:						
Outcomes			an industry related to mathematical	sciences					
Cateomes		•	of how mathematics is used to solve						
Pre-requisites (and Co-requisites and Impermissible combinations)	MATH4XX This capst	Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics, and Mathematics/Physics Majors.  This capstone course is for Mathematics, and Mathematics/Physics Majors students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.							
Offer in 2017 - 2018	Y 1st	sem 2nd sem Sumn	ner Offer in 2018 - 2019 : Y	Examination	No Exam				
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by supervisor(s). Ithe job. Successfully fulfills and evaluation by supervisor of "Distinction".  Very limited or no ability to sby supervisor(s). Fails to es	solve problems in the workplace. Successful Establishes effective collaboration and comr the requirements set out in the Course Desc or(s), etc. Students demonstrating excellent solve problems in the workplace. Fails to har tablish effective collaboration or communical uirgments set out in the Course Description.	nunication with supervisor(s), or cription regarding working hours performance in the above woundle or carry out the work require tion with supervisor(s), other coll	olleagues, and clients in written and oral report, ald be awarded a grade and in the job or assigned eagues, or clients in the				
		job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.							
Course Type	Internship								
Course Teaching	Activities		Details		No. of Hours				
& Learning Activities	Internship	work	it is expected that students are to (or the equivalent of 4 weeks full-ti		160				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Written re	port	written report, employer's feedback and oral presentation	100	CLO 1,2				
Additional Course Information	be recorde interested Enrolment	disfactory completion of this course can be counted towards the Capstone requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on "Pass/Fail" basis. Students who are terested to enrol in this course should contact the Department to obtain the approval. In nrolment of this course is not conducted via the online course selection system and should be made through the elevant Department/School office after approval has been obtained from the course coordinator.							

MATH4999	Mathematics project (12 credits)	Academic Year	2017				
Offering Department	Mathematics	Quota					
Course Co-ordinator	Prof T W Ng, Mathematics (ntw@maths.hku.hk)						
Teachers Involved	(All teaching staff, Mathematics)						
Course Objectives	The aim of the course is to provide students with the opportunity to formulate and to investigate, in depth, problems of practical interest and/or to have a foretaste of mathematical research. The work, to be done on an individual basis, is considered a highly desirable part of the training of a mathematician.						
Course Contents & Topics	The subject matter of the project will be determined by consultation between the student and his/her supervisor. The projects will be selected from areas of pure and applied mathematics. Students must achieve good standing and get the approval from both the prospective supervisor and the course co-ordinator to take this course.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 study independently and in depth an advanced topic that is not available in the regular curriculum						

	CLO 2	nalyze and synthesize in	formation gathered from differen	t sources			
	CLO 3 articulate their findings and conclusions						
	CLO 4	ive an exposition of their	work in a written report				
Pre-requisites (and Co-requisites and Impermissible combinations)	MATH4XX MATH340 Subject to This caps	Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics, and Mathematics/Physics Majors including MATH3301, MATH3401, and MATH3403.  Subject to approval by the Department.  This capstone course is for Mathematics, and Mathematics/Physics Majors students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2017 - 2018	Y Ye	ar long Offer in 2018 - 2	2019 : Y	Examination	n No Exam		
Grade Descriptors (A+ to F)	Α	original thought. Insightful u	o of the subject. Show strong analytical se and critical evaluation of information e of data and results to draw appro- ional skills.	drawn from a broad range of hi	igh quality sources and to		
	B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.						
	С	C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
	Fail	Demonstrate evidence of lit analytical and critical abilitie	tle or no grasp of the knowledge and es, logical and coherent thinking. Limited results and/or unable to draw appropria	understanding of the subject. End use of secondary sources and	no critical comparison of		
Course Type	Project-ba	ased course					
Course Teaching	Activitie	S	Details	No. of Hours			
& Learning Activities	Reading / Self study		independent work & to attend meetings & seminars		240		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Dissertat	ion	Written report plus oral presentation	100	CLO 1,2,3,4		

MATH7101	Interm	ediate complex	analysis (6 credits)	Academic Yea	r 2017		
Offering Department	Mathem	atics		Quota			
Course Co-ordinator	Prof N M	Nok, Mathematics (	nmok@hku.hk)				
Teachers Involved	(Prof N I	Mok, Mathematics)					
Course Objectives		The objective is to familiarize students with analytic, algebraic and geometric concepts and techniques in the study of Complex Analysis in a single variable beyond an introductory course on functions of a complex variable.					
Course Contents & Topics	using a meromo Problem - In the different - A choi Mapping	<ul> <li>In the course we study meromorphic functions on compact Riemann surfaces and on open Riemann surfaces using analytic and algebraic techniques. Topics on meromorphic functions include the constructions of meromorphic functions on compact Riemann surfaces, elliptic functions, Poincare series, the Mittag-Leffler Problem and the Weierstrass Problem on compact Riemann surfaces and on open Riemann surfaces.</li> <li>In the course of study of meromorphic functions, sheaf cohomology theory and cohomology theories in terms of differential forms will be introduced.</li> <li>A choice of other topics may be included. Examples of possible topics include normal families, the Riemann Mapping Theorem, geometric theory of holomorphic mappings, potential theory in one complex variable, complex dynamics, and special functions.</li> </ul>					
Course Learning	On succ	essful completion of	of this course, students should be able to	):			
Outcomes		meromorphic functi	functions on the Riemann Sphere a ons on elliptic curves	·			
	CLO 2 formulate various classical existence problems on meromorphic functions and reduce them to analytic or cohomological problems, being able to solve them in certain typical cases						
	CLO 3 identify the key arguments in the proofs of various mathematical results concerning meromorphic functions on compact Riemann surfaces or on plain domains						
	CLO 4 identify the key elements in the theoretic foundation of various additional topics covered in the course and to make use of them in solving problems						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	a first course in Co	mplex Analysis such as MATH3403, and	I approval by the course coord	dinator.		
Offer in 2017 - 2018	Y 19	st sem Offer in 20	118 - 2019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.					
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
Course Type		based course					
Course Teaching	Activiti	es	Details		No. of Hours		
& Learning Activities	Lecture				36		

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination		50	CLO 1,2,3,4		
	Test		50	CLO 1,2,3,4		
reading and	R. Narasimhan: Complex Analysis in One Variable (Birkhauser, 2001, 2nd edition) D. Forster: Lectures on Riemann Surfaces (Springer-Verlag, 1981)					
online materials		. Conway: Functions of One Complex Variable I (Springer-Verlag, 1995) Chandrasekharan: Elliptic Functions (Springer-Verlag, 1985)				

MATH7201	Topics	in geometry (6 c	redits)		Academic Year	2017		
Offering Department	Mathema		•		Quota			
Course Co-ordinator	TBC, Ma	thematics ()						
Teachers Involved								
Course Objectives		his course introduces to students a main area of differential geometry beyond the notion of manifolds and the alculus of differential forms and prepares them to study further and to do research in geometry.						
Course Contents & Topics	following: (i) Riema and Dirac (ii) Symp group ac (iii) Vector	The topic varies according to the year and the instructor. For example, it can be one of (but not restricted to) the						
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 h	ave a working know	ledge of the calculus of diff	ferential forms beyond th	ne level of MATH3	511		
	CLO 2 u	inderstand the keys	points of the particular subj	ject chosen and be read	y to learn other to	pics in Geometry		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (	Pass in (MATH4402 or MATH4501) and (MATH4511 or the approval of the course coordinator)						
Offer in 2017 - 2018	N Of	fer in 2018 - 2019 : I	V		Examination			
Grade Descriptors (A+ to F)	В	applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.						
		theorems or their applications and presentation or with some minor computational errors.						
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.						
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.						
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.							
Course Type	Lecture-b	pased course						
Course Teaching	Activitie	-	Details	Details		No. of Hours		
& Learning Activities	Lectures					36		
	Reading	/ Self study				100		
Assessment Methods and Weighting	Methods	5	Details		nting in final e grade (%)	Assessment Methods to CLO Mapping		
	Assignments				50	CLO 1,2		
	Examina	ition			50	CLO 1,2		
Required/recommended reading and online materials	TBC							

MATH7202	Complex manifolds (6 credits)	Academic Year	2017						
Offering Department	Mathematics	Quota							
Course Co-ordinator	TBC, Mathematics ()	C, Mathematics ()							
Teachers Involved									
Course Objectives	This course aims to present the foundation of the theory of complex nursely of research topics, focusing on compact complex manifolds.	nanifolds and to introdu	ce students to a						
Course Contents & Topics	<ul> <li>This course contains an introductory part on basic notions on complex cohomology theories in terms of differential forms, Hermitian and Kahle vector bundles.</li> <li>It proceeds to introduce the theory of harmonic forms, establishing formanifolds including Serre duality, the Kodaira Vanishing Theorem, the Mecomposition on compact Kahler manifolds.</li> <li>The course concludes with a choice of topics on analytic and geomanifolds. Examples of such topics include</li> <li>(i) Siegel's Theorem on the field of meromorphic functions on a compact of its geometry of compact quotients of bounded symmetric domains and Hermanifolds in introduction to the deformation theory of compact complex submanifolds in introduction to the deformation theory of complex structures on a compact complex structures.</li> </ul>	er manifolds, and Hermi undamental results on of Kodaira Embedding The netric aspects of the the complex manifold; ermitian symmetric manif ifolds in a complex manifolds	itian holomorphic compact complex orem and Hodge eory of complex folds; fold;						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 grasp the notion of holomorphic line bundles, understand variou global holomorphic sections of line bundles, and to relate them manifolds								

	n	O 2 grasp the relationship between sheaf cohomology, de Rham cohomology and d-bar cohom make use of the relationship to solve various existence problems by means of vanishing that harmonic forms					
	m	nanifolds and on H f curvature and ap	complex differential geo lermitian holomorphic ve ply them to vanishing ar	ector bundles, and b nd embedding theore	e able to relate various ems	notions of positivity	
			ments in the theoretic fon in solving problems	undation of various	additional topics covere	d in the course and	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in a	a first course in C	omplex Analysis such a by the course coordinato		st course in Differentia	Geometry such as	
Offer in 2017 - 2018	N Of	fer in 2018 - 2019	: N		Examination		
Grade Descriptors (A+ to F)	A	applications through and being able to ca	cellent understanding of key on correctly analysing problems arry out computations carefully	s, clearly and elegantly p and correctly, and with s	resenting correct logical reas- some innovative approaches t	oning and argumentation o solving problems.	
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail	ail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or no being able to complete the solution.					
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	s	Details			No. of Hours	
& Learning Activities	Lectures					36	
	Reading	/ Self study				100	
Assessment Methods and Weighting	Methods	<b>S</b>	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examination				50	CLO 1,2,3,4	
	Test				50	CLO 1,2,3,4	
Required/recommended reading and online materials	Publisher K. Kodai Wissenso	2. Griffiths & J. Harris: Principles of Algebraic Geometry, Pure and Applied Mathematics (Wiley-Interscient Jublishers, New York 1978)  [Interpretation of Complex Structures (Grundlehren der mathematische Wissenschaften 283, Springer-Verlag, Berlin-Heidelberg 1986)  [Interpretation of Lording Structures (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Metric Rigidity					

MATH7217	Topics	in financial mathema	atics (6 credits)	Academic Yea	r 2017				
Offering Department	Mathema	atics	•	Quota					
Course Co-ordinator	Dr J Son	ng, Mathematics (txjsong@	)hku.hk)						
Teachers Involved		· · · · ·	·						
Course Objectives		his course aims at introducing students to fundamental knowledge in financial mathematics and risk anagement. It can help preparing students to research or take more advanced courses in those directions.							
Course Contents & Topics	- Interes - Mather - Estima	Investment models and portfolio theory. Interest rate modeling. Mathematics of financial derivatives, pricing and hedging. Estimation and modeling of volatilities. Risk measures and risk management.							
Course Learning	On succ	essful completion of this c	ourse, students should be able to:						
Outcomes			utilize various models and results		ate				
	CLO 2	grasp the methodology in	derivative pricings and the modelin	g of volatilities					
	CLO 3		utilize the concept of risk measure		bject to the topics				
Pre-requisites (and Co-requisites and Impermissible combinations)		an advanced level mathe of the course coordinator	ematics courses (MATH3XXX, MA	TH4XXX, or MATH7XXX)	and subject to the				
Offer in 2017 - 2018	N O	ffer in 2018 - 2019 : N		Examination					
Grade Descriptors (A+ to F)	Α	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and arguments and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.							
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.								
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.								
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.								
	Fail	Demonstrate poor and inade being able to complete the s	equate understanding by not being able to olution.	identify appropriate theorems or the	neir applications, or not				
Course Type	Lecture-	based course							
Course Teaching	Activities		Details		No. of Hours				
& Learning Activities	Lectures				36				
	Reading	g / Self study			100				
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods				

			to CLO Mapping
	Assignments	50	CLO 1,2,3
	Examination	50	CLO 1,2,3
Required/recommended reading and online materials	TBC		

MATH7219	Topics	in applied functional	analysis (6 credits)	Academic Yea	r 2017			
Offering Department	Mathema	atics		Quota				
Course Co-ordinator	TBC, Ma	thematics ()						
Teachers Involved								
Course Objectives	introduci mathema	This is a graduate to advanced undergraduate university level course on applied functional analysis, which aims a introducing to students the basic knowledge of using functional analysis on various applied topics in mathematics. This course would lay a foundation for students in studying more advanced mathematical courses.						
Course Contents & Topics	differenti - Sobole - Hilbert spectral - Applica	Generalized functions (also called distributions), delta function, generalized Fourier Transform. Applications differential equations, Fundamental solution, Green's function.  Sobolev spaces, Sobolev Embedding Theorem, Trace.  Hilbert space linear operator theory (bounded operators, compact operators, closed unbounded operators, spectral theory. Applications to differential equations (infinitesimal generator, semigroup of linear operators). Applications to optimization problems.  Wherever needed, we shall also review techniques for Metric spaces (Category Theorem), Banach spaces (Hasanach Theorem, Opening Mapping Theorem, Closed Graph Theorem and Uniform Boundedness Principle) a						
			best approximation, Fourier i		ioco i imolpio, and			
Course Learning			ourse, students should be ab					
Outcomes			ns and their Fourier transform					
				the process of solving differential	equations			
	CLO 3 understand Hilbert space linear operator theory and apply it in solving differential equations CLO 4 apply these results to optimization problems							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in I	Pass in MATH3401 and MATH4404, or approval of the course coordinator.						
Offer in 2017 - 2018	N O	ffer in 2018 - 2019 : N		Examination				
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.							
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.							
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.							
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.							
	<b>Fail</b> Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or n being able to complete the solution.							
Course Type	Lecture-l	based course						
Course Teaching	Activitie	es	Details		No. of Hours			
& Learning Activities	Lectures	3			36			
	Reading / Self study				100			
Assessment Methods and Weighting	Method	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm	nents		50	CLO 1,2,3,4			
	Examina			50	CLO 1,2,3,4			
Required/recommended reading and online materials					, ,-,-			

MATH7224	Topics i	in adva	nced prob	ability th	eory (6 cr	edits)		Academic Year	2017
Offering Department	Mathemat	Mathematics Quota							
Course Co-ordinator	Dr J Song	g, Mathe	matics (txjso	ng@hku.hk	:)				
Teachers Involved	(Dr J Song	ng,Mathe	matics)						
Course Objectives	undergrad	This course aims at introducing fundamental knowledge in probability theory to graduate students and senior undergraduate students. It can help preparing these students for advanced research in probability theory and its wide-range applications.							
Course Contents & Topics			aw of large r an motion.	numbers, ce	entral limit t	heorems, rando	om walks, m	artingales, Marko	v chains, ergodi
Course Learning	On successful completion of this course, students should be able to:								
Outcomes	CLO 1 demonstrate in-depth understanding of basic concepts and terminologies in probability theory								
	CLO 2 understand and apply the fundamental theorems for further problem solving in theory or practice, the learning outcomes are subject to the topics chosen that year								
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M.	MATH360	03 and MATH	14402, and	approval of	the course coo	rdinator.		
Offer in 2017 - 2018	Y 2nd	id sem	Offer in 2018	3 - 2019 : N				Examination	May
Grade Descriptors	Α							identify the appropriat orrect logical reasonin	

(A+ to F)		and being able to carry out c	omputations carefully and correctly, and	with some innovative approaches t	to solving problems.		
	В	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	С		understanding of key concepts and ide es in applying the theorems through minor computational errors.				
	D		anding of key concepts and ideas by be applying the theorems through incorrectle al errors.				
	Fail	Demonstrates poor and inad being able to complete the so	equate understanding by not being able olution.	to identify appropriate theorems or	r their applications, or not		
Course Type	Lecture-ba	ased course					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures			36			
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			50	CLO 1.2		
	Assignme	TIIS		50	OLO 1,2		
	Examinati			50	CLO 1,2		
Required/recommended reading and online materials	Examinati Rick Durre	ion	and Examples, Cambridge Ser ), 4th edition)	50	CLO 1,2		

MATH7501	Topics i	n algebra (6 credits)	)	Academic Yea	ar 2017				
Offering Department	Mathemat			Quota					
Course Co-ordinator	Dr J Liu, N	Mathematics (jliu02@hku	ı.hk)						
Teachers Involved									
Course Objectives	To provid depth.	e students specializing	in mathematics with the opportunity	to study some topics in	algebra in greater				
Course Contents & Topics	forms; mu	A selection of advanced topics in algebra such as group theory; rings and modules; Galois theory; quadratic orms; multilinear algebra; algebraic number theory; group representations; commutative algebra; Grobner basis neory; introduction to algebraic geometry. Topics may vary from year to year.							
Course Learning	On succes	ssful completion of this c	course, students should be able to:						
Outcomes	CLO 1	acquire knowledge in t	the covered topics to considerable de	epth					
	CLO 2	if he/she wishes, pursu	ue more advanced studies in areas o	f algebra					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	iss in MATH4302							
Offer in 2017 - 2018	N Off	er in 2018 - 2019 : N		Examination					
Grade Descriptors (A+ to F)	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.								
	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and thei applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.								
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.								
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation of with substantial computational errors.								
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.								
Course Type	Lecture-ba	ased course							
Course Teaching	Activities	5	Details		No. of Hours				
& Learning Activities	Lectures				36				
	Reading /	/ Self study			100				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignme	ents	coursework assessments (may include presentations)	50	CLO 1,2				
	Examinat	ion	One 2.5-hour written examination	50	CLO 1,2				
Required/recommended reading and online materials	To be dec	sided by the course instru	uctor.						
Course Website	http://moo	dle.hku.hk/							

MATH7502	Topics in applied discrete mathematics (6 credits)	Academic Year	2017
Offering Department	Mathematics	Quota	
Course Co-ordinator	Prof W Zang, Mathematics (wzang@maths.hku.hk)		
Teachers Involved			
Course Objectives	This is a follow-up of the course MATH2600/MATH3600. It introduces student and probabilistic methods that have been used with striking success in discrete the most fundamental and beautiful results obtained by these methods.		
Course Contents & Topics	Linear algebra method: rank argument, eigenvalue technique, polynomial tec     Probabilistic method: basic method, linearity of expectation, deletion method moment method.		

	3. Additio	nal techniques if time p	ermits.				
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 d	lemonstrate knowledge	and understanding of some research	areas of applied discrete	e mathematics		
	CLO 2 s	olve various discrete m	athematics problems using linear alge	bra and probabilistic me	thods		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (MATH3301 or MATH3600), and approval of the course coordinator.						
Offer in 2017 - 2018	N Off	fer in 2018 - 2019 : Y		Examination			
Grade Descriptors (A+ to F)	A	applications through corre	understanding of key concepts and ideas by b ctly analysing problems, clearly and elegantly it t computations carefully and correctly, and with	presenting correct logical reas	oning and argumentation		
	В	Demonstrate a good und applications through corre	erstanding of key concepts and ideas by bein ectly analysing problems, but with some minor ons and presentation or with some minor compi	ng able to identify the appropriate in arguments, in	riate theorems and their		
	С	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details	No. of Hours			
& Learning Activities	Lectures				36		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	<b>S</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents	coursework assessment	50	CLO 1,2		
	Examina	tion	One 2.5-hour written examination	50	CLO 1,2		
Required/recommended reading and online materials	Instructor	Instructor's lecture notes.					
Offillie filaterials							

MATH7503	Topics i credits)	Topics in mathematical programming and optimization (6 credits)						
Offering Department	Mathemat	Mathematics Quota						
Course Co-ordinator	TBC, Matl	C, Mathematics ()						
Teachers Involved								
Course Objectives		study in greater depth of some special topics in mathematical programming or optimization. It is mainly intende students in Operations Research or related subject areas.						
Course Contents & Topics	objective	A selection of advanced topics, which may include convex, quadratic, geometric, stochastic programming, mult objective programming and goal programming; or discrete and combinatorial optimization. The selection may vary from year to year.						
Course Learning Outcomes	CLO 1 ur	n successful completion of this course, students should be able to:  LO 1 understand the advanced concept and approach of the mathematical programming topic(s) and/ optimization approaches as appropriate in Operations Research						
			edge and understanding of the underlyin porithms plus their extensions	g theory and technique	s of the various			
Pre-requisites (and Co-requisites and Impermissible combinations)		ass in MATH3901, MATH3904 and MATH4902						
Offer in 2017 - 2018	N Off	er in 2018 - 2019 :	N	Examination				
Grade Descriptors (A+ to F)	B C	applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.  B Demonstrate a good understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.						
	presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.							
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or no being able to complete the solution.							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Lectures				36			
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents	coursework assessment based on assignments and two class tests	50	CLO 1,2			
	Examinat	ion	One 2.5-hour written examination	50	CLO 1,2			
Required/recommended reading and online materials	S.P. Brad	ley, A.C. Hax and	etty: Nonlinear Programming (John Wiley & S T. Magnanti: Applied Mathematical Progran combinatorial Optimization (John Wiley & So	nming (Addison-Wesley, 1	977)			

S.S. Rao: Optimization Theory and Applications (Wiley Eastern Ltd., 1978)
G. Nemhauser and L. Wolsey: Integer and Combinatorial Optimization (John Wiley & Sons, 1988)
J.P. Ignizio: Introduction to Linear Goal Programming (Beverly Hills: Sage, 1985)

MATH7504	Geomet	ric topology (6	credits)		Academic Ye	ar 2017			
Offering Department	Mathemat	lathematics Quota							
Course Co-ordinator	TBC, Math	nematics ()							
Teachers Involved									
Course Objectives		This course gives a geometric introduction to some of the methods of algebraic topology. The emphasis throughout will be on the geometric motivations and applications of the theory.							
Course Contents & Topics		- Continuity. Compactness. Connectedness. The fundamental group. Triangulations and classification of surfaces Theory and applications of simplicial homology. Theory of covering spaces. Theory of attaching spaces.							
Course Learning	On succes	ssful completion o	of this course, students	s should be able to:					
Outcomes			eas and constructions ions in algebraic topol	•	both in pursuing the dee	eper theories as well			
		nderstand the ide anifolds	as of attaching spac	e, complexes, lifting	and extension properti	es, and surgery on			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH3301 and MA	ATH3401						
Offer in 2017 - 2018	N Offe	er in 2018 - 2019	: N		Examination				
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.								
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.								
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.								
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation of with substantial computational errors.								
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or n being able to complete the solution.								
Course Type		ased course							
Course Teaching	Activities	3	Details			No. of Hours			
& Learning Activities	Lectures					36			
	Reading /	Self study				100			
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents	coursework a	ssessment	50	CLO 1,2			
	Examinat		One 2.5-hour	written examination	50	CLO 1,2			
Required/recommended reading and online materials			ology (Springer-Verlactory) to Algebraic Topology		M)	· ·			

MATH7505	Real ar	nalysis (6 credits)	Academic Yea	ar 2017					
Offering Department	Mathema	atics	Quota						
Course Co-ordinator	Prof K M	Tsang, Mathematics (kmtsang@maths.hku.hk)							
Feachers Involved	(Prof K N	M Tsang, Mathematics)							
Course Objectives	The aim	The aim of the course is to introduce the basic ideas and techniques of measure theory and the Lebesgue integral.							
Course Contents & Topics	- The Lel - Differer - Genera theorems	<ul> <li>Lebesgue Measure on R: Measurable sets and Lebesgue measure, Measurable functions.</li> <li>The Lebesgue Integral: The Lebesgue integral, modes of convergence.</li> <li>Differentiation and Integration: Functions of bounded variation, Differentiation of an integral, absolute continuity.</li> <li>General Measure and Integration Theory: Measurable spaces, measurable functions, integration, convergence theorems, the Radon-Nikodym theorem.</li> <li>The L^p Spaces: The L^p spaces, convergence and completeness, bounded linear functionals.</li> </ul>							
ourse Learning		essful completion of this course, students should							
Outcomes	CLO 1 describe basic properties of Lebesque measure and measurable functions								
	CLO 2 construct the Lebesgue integral, elucidate its basic properties and appreciate the existence of other useful integration theories besides Riemann's CLO 3 understand the basic features of L^p spaces								
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in N	MATH3401							
Offer in 2017 - 2018	Y 2n	nd sem Offer in 2018 - 2019 : Y	Examination	May					
Grade Descriptors (A+ to F)	A	Demonstrate a thorough understanding of all concepts and ideas by being able to draw complex connections among varior concepts and apply the theorems through correctly analysing problems, clearly and elegantly presenting correct logic reasoning and argumentation, and with some innovative approaches to solving problems.							
	В	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, reasoning, identifying the appropriate theorems, applications, or presentation.							
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with acceptable argument and presentation.							
	D	Demonstrate some understanding of key concepts and substantial inadequacies in applying the theorems throu	igh incorrectly analysing problems with poor argu-	ment or presentation.					
	<b>Fail</b> Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, and not being able to complete the solution.								

Course Type	Lecture-based course	Lecture-based course						
Course Teaching	Activities	Details		No. of Hours				
& Learning Activities	Lectures			36				
	Reading / Self study			100				
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignments		10	CLO 1,2,3				
	Examination	One 2.5-hour written final examination	50	CLO 1,2,3				
	Test		40	CLO 1,2,3				
Required/recommended reading and online materials		H.L. Royden: Real Analysis (Pearson) W. Rudin: Real and Complex Analysis (McGraw Hill)						
Course Website	moodle.hku.hk							
Additional Course Information	Tutorial timetable: http://hkumath.hku.hk/~math/T	imetable/tutorials1718_S2.pdf						

PHYS1050	<b>Physics</b>	for engineering stu	idents (6 credits)	Academic Year	2017				
Offering Department	Physics			Quota					
Course Co-ordinator	Prof K S C	Cheng, Physics (hrspks)	c@hku.hk)						
Teachers Involved	(Dr M K Y	Dr C C Ling,Physics) Dr M K Yip,Physics) Prof K S Cheng,Physics)							
Course Objectives	This cour	his course offers a comprehensive training of physics for engineers. It covers the major physical laws on nechanics, electricity and magnetism. A calculus-based approach is adopted.							
Course Contents			cuss the following topics:	on io adopted.					
& Topics	Units and Friction, C System of Electrosta Moving Cl	Units and Dimensional Analysis, Motion of a Particle in One and Two Dimensions, Newton's Laws of Motion, Circular Motion, Force, Impulse and Momentum, Force Polygon and Static Equilibrium, Work and Energy, System of Particles, Moment of Inertia and Rotation of a Rigid Body, Simple Harmonic Motion and Pendulum; Electrostatic Fields and Potential, Gauss's Law, DC circuits, Magnetic field due to Moving Charges, Force on a Moving Charge in Magnetic Field, Biot-Savart law, Ampere's law, Electromagnetic Induction, Faraday's Law, Eddy Currents, AC circuits, Phases in Capacitive and Inductive Circuits, Power, DC and AC Generators, Transformer.							
Course Learning	On succes	ssful completion of this of	course, students should be abl	e to:					
Outcomes	CLO 1	describe and explain the	e physical principles of mechan	nics, electricity and magnetism					
	CLO 2	apply these principles to	situations of the physical and	engineering world					
			problems using the calculus-b						
	CLO 4	acquire and interpret ex	perimental data to examine the	e physical laws					
Pre-requisites (and Co-requisites and Impermissible combinations)	(Level 2 o		Module 2 of HKDSE Mathema	Physics components or equivalen tics or equivalent, or Pass in MA <sup>-</sup>					
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offer	in 2018 - 2019 : Y	Examination	Dec May				
Grade Descriptors	Α			ive knowledge and skills required for at	,				
(A+ to F)	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar								
	_	and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques.  Correct use of data of results to draw appropriate conclusions.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning							
		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.							
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcome Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to app knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.								
	Fail	of analytical and critical al problems. Organization and	bilities, logical and coherent thinking	skills required for attaining the course leads. Show very little or no ability to apply fective or ineffective. Apply minimally effective appropriate conclusions.	knowledge to solve				
Course Type	Lecture w	ith laboratory componer	nt course						
Course Teaching	Activities	3	Details		No. of Hours				
& Learning Activities	Lectures				36				
	Laborator	гу			6				
	Tutorials				8				
	Reading /	/ Self study			72				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignme	ents		10	CLO 1,2,3				
	Examinat		2-hour written exam	70	CLO 1,2,3				
	Laborator			10	CLO 1,4				
	Test	· I		10	CLO 1,2,3				
Di		, ,							
Required/recommended reading and	R. Serway	y and J.W. Jewett: Phys	ics for Scientists and Engineer	rs (Thomson, 2009, 8th edition)					
	R. Serway R. D. Knig	y and J.W. Jewett: Phys							

PHYS1055	How things work (6 credits)	Academic Year	2017				
Offering Department	Physics	Quota					
Course Co-ordinator	Dr M K Yip, Physics <i>(mankit@bohr.physics.hku.hk)</i>						
Teachers Involved	(Dr M K Yip,Physics)						
Course Objectives	This course is designed for students in all disciplines and all years who are cur course covers the working principles and mechanisms of the things and phen and appreciation of science are emphasized with mathematics kept at a minimus scientific intuition and to understand that many "magical" things in everyday life	omena around us ım. Students are t	. Logical thinking rained to develop				
Course Contents & Topics	Topics include: the science in the household and the science of driving, sports are explored with simple and lucid explanations. Developments in optical recor and the magnetic levitated trains in public transportation are introduced as ex Contents of the course are constantly updated to reflect the advances in modern	ding, medical imagamples of the mo	ging for diagnosis dern technology.				
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 describe and discuss the physical principles that are behind the house issues in daily life CLO 2 demonstrate their knowledge to related topics qualitatively CLO 3 criticize and express views in logical and effective ways CLO 4 recognize the significance of science and technology	Contents of the course are constantly updated to reflect the advances in modern science and technology.  On successful completion of this course, students should be able to:  CLO 1 describe and discuss the physical principles that are behind the household appliances and the scientific issues in daily life  CLO 2 demonstrate their knowledge to related topics qualitatively  CLO 3 criticize and express views in logical and effective ways					
Pre-requisites	NIL						

(and Co-requisites and Impermissible combinations)						
Offer in 2017 - 2018	Y 2n	d sem Offer in 2018 - 2	2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	of analytical and critical a		d skills required for attaining the course g. Show very little or no ability to ap ffective or ineffective.		
Course Type	Lecture-b	ased course	,			
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures			36		
	Tutorials				12	
	Reading	/ Self study			80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		25	CLO 1,2,3,4	
	Examina	tion	2-hour written exam	50	CLO 1,2,3,4	
	Presenta	tion		25	CLO 1,2,3,4	
Required/recommended reading and online materials		'		ife (John Wiley & Sons, Inc, 200	98, 3rd edition)	
Course Website	http://www	v.physics.hku.hk/~phys1	1055/			

PHYS1056	Weathe	r, climate and climate	e change (6 credits)	Academic Yea	r 2017	
Offering Department	Physics		•	Quota		
Course Co-ordinator	Dr K M L	ee, Physics (kmlee@lily.pl	hysics.hku.hk)			
Teachers Involved	(Dr P W I (Dr T C L	Lee,Physics) Li,Hong Kong Observatory Lee,Hong Kong Observator Wong,Hong Kong Observa	ry)			
Course Objectives	students technolog	the fundamentals of weat gical advancements.	ortant role in human activities and ther, climate and climate changes,	to arouse their interests i	n the scientific and	
Course Contents & Topics	humidity, climate. interpreta Experts f forecasts and clim	The course will encompass topics on: basic physical principles on weather phenomena like: wind, temperature, numidity, cold/warm fronts, thunderstorms and tropical cyclones; introductory weather analysis, forecast and dimate. Through real life examples, students will get familiarized with the weather/climate science and interpretation of meteorological information, climatology and climate change. Experts from the Hong Kong Observatory (HKO) will participate in the course to cover aspects on daily weather precasts, public weather services, local severe weather phenomena, tropical cyclones, climatology of Hong Kong, and climate change. They will also supervise course projects that involve a visit to the HKO to study the meteorological facilities and understand the operational activities on weather and climate.				
Course Learning Outcomes	On succe CLO 1 re CLO 2 a O CLO 3 ic W	essful completion of this co ecall the basic principles o pply the principles to inter r media dentify and explain the differ orld xplain the basic causes of	ourse, students should be able to:	for example from the HKC Hong Kong as compared to pacts		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL		, , ,			
Offer in 2017 - 2018	Y 1st	t sem Offer in 2018 - 201	19 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course					
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Show evidence of some cohe knowledge to solve problems	ed command of knowledge and skills requiverent and logical thinking, but with limited ar Apply limited or barely effective organization	nalytical and critical abilities. Sho onal and presentational skills.	v limited ability to apply	
	Fail	of analytical and critical abil	ence of command of knowledge and skills ru lities, logical and coherent thinking. Show presentational skills are minimally effective of	very little or no ability to app		
Course Type	Lecture-b	ased course	·			
Course Teaching & Learning Activities	Activitie	s	Details		No. of Hours	

	Lectures			36
	Tutorials			12
	Reading / Self study			80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		25	CLO 1,2,3,4,5
	Examination	2-hour written exam	50	CLO 1,3,4,5
	Test		25	CLO 1,3,4,5
Required/recommended reading and online materials		Course Coordinator ard Tarbuck: The Atmosphere (Pear	son Prentice Hall, 2013)	
Course Website	http://moodle.hku.hk			

PHYS1057	Kitchen	science (6 credits)		Academic Yea	r 2017		
Offering Department	Physics			Quota			
Course Co-ordinator	Prof A B D	jurisic, Physics (dalek(	@hku.hk)				
Teachers Involved	(Prof A B [	Ojurisic,Physics)					
Course Objectives			ents' understanding of basic scienc their critical thinking skills.	e behind the common daily	activities related to		
Course Contents & Topics	food prepa demonstra The topics foams and jelly); cryst and chem application values in c textures);p	e course will introduce basic scientific concepts and principles necessary to understand different methods of preparation, as well as kitchen tools. The introduced concepts will be illustrated in recipes and practical monstrations.  e topics include: basic food molecules (water, carbohydrates, fats, protein); ams and bubbles (various examples, beer, sodas, ice-cream); colloids, emulsions, gelation (various sauces, y); crystallization (sugar, sugar syrups, honey, chocolate); taste and flavor (herbs, spices); cooking processes d chemical reactions (Maillard reactions, caramelization, etc.); chemical reactions for rising dough with plication to cakes, bread and cookies; fermentation (alcoholic beverages, fermented dairy products, tofu); pH ues in cooking, natural and artificial food colorings, culinary curiosities; molecular gastronomy (novel flavors and tures); principles of operation of kitchen tools, such as non-stick cookware, pressure cookers, induction heating ages, microwave ovens, etc.					
Course Learning	On succes	sful completion of this	course, students should be able to:				
Outcomes		•	eration of kitchen tools encountered				
	CLO 2 ex	plain basic physical an	d chemical processes involved in fo	od preparation			
	CLO 3 illu	strate how preparation	method affects the flavor and textu	re of food			
		alyze common metho ocedures in certain way	ods of food preparation and un	derstand scientific reasons	for performing		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N		Examination			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course						
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning						
	outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail	of analytical and critical a problems. Organization and	idence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	ow very little or no ability to appl			
Course Type	_	ised course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials	0 15 1 1	inlcuding demonstration (12 hours)		24		
		Self study			72		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme		essay & student presentations	70	CLO 1,2,3,4		
	Examinati	on		30	CLO 1,2,3,4		
Required/recommended reading and online materials	T. Lister and S. T. Beck R. L. Wolk Peter Barh	xamination  acture notes provided by Course Coordinator Lister and H. Blumenthal: Kitchen Chemistry (Royal Society of Chemistry, 2005)  T. Beckett: The Science of Chocolate (Royal Society of Chemistry, 2005)  L. Wolke: What Einstein Told His Cook (W.W. Norton & Company Inc., New York, 2002 eter Barham: The Science of Cooking (Springer-Verlag, Berlin, 2001) A. Gardiner and S. Wilson: The Inquock (Exploratorium, Henry Holt and Company, LLC, New York, 1998)					

PHYS1150	Problem solving in physics (6 credits)	Academic Year	2017
Offering Department	Physics	Quota	
Course Co-ordinator	Dr S Z Zhang, Physics (shizhong@hku.hk)		
Teachers Involved	(Dr S Z Zhang, Physics)		
Course Objectives	This course provides a basic training on the methods and tools that are common training or the methods and tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools that are common training or the methods are tools to the method training or the met	monly used in phy	sics. It prepares

	through ta	ckling physical problem	e to learn the subject. Students s. Rudimentary of analytic as w or may also be followed by Me y.	ell as numerical calculation	using Matlab will be	
Course Contents & Topics	problems. operation, to physica	Topics include: Dime conic sections and topic	oles and theories of various too nsional analysis, polynomials a cs related to practical calculus: I practical problems solving skills a cussed.	and complex numbers, ruc mits, differentiation and inte	limentary of matrix gration. Applications	
Course Learning			ourse, students should be able t			
Outcomes		ate physical systems by ad physics	the language of mathematics a	nd employ mathematical log	jic and reasoning to	
	CLO 2 apply calculus to solve problems					
	so	lving physical problems	ious solving tools in physics as		propriate tools when	
			petween mathematical equations			
			sical problems both qualitatively			
			ysical meaning of result after calc	culations		
Pre-requisites (and Co-requisites and Impermissible combinations)		above in HKDSE Physion without Level 3 or above	cs or equivalent; in HKDSE Physics but having a	a pass in PHYS1240 may be	e allowed to take this	
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	learning outcomes. Show st to apply knowledge to a wi	tery at an advanced level of extensive rong analytical and critical abilities and l ide range of complex, familiar and unfa highly effective observation skills and tec	ogical thinking, with evidence of or miliar situations. Apply highly effective	iginal thought, and ability ective organizational and	
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective observation skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective observation skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
Course Type	Lecture wi	th laboratory componen	t course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Laborator	у			6	
	Tutorials				8	
		Self study			80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme			20	CLO 1,2,3,4,5,6	
	Examinat		2-hour written exam	50	CLO 1,2,3,4,5	
	Laborator	y reports		10	CLO 3,5,6	
	Test			20	CLO 1,2,3,4,5	
Required/recommended reading and		otes provided by Course or, Basic Training in Matl	Coordinator nematics: A Fitness Program for	Science, Springer, 1995		
online materials						
Course Website	http://moo	dle.hku.hk				

PHYS1240	Physics by inquiry (6 credits)	Academic Year	2017		
Offering Department	Physics	Quota			
Course Co-ordinator	Dr F K Chow, Physics (judychow@hku.hk)				
Teachers Involved	(Dr F K Chow, Physics)				
Course Objectives	This course aims at providing students a solid background and knowledge in physics as well as its connection with our daily life phenomena and activities.				
Course Contents & Topics	The course has a general coverage in most physics topics and is conducted integral calculus. Emphasis will be stressed on the understanding of variothrough qualitative and simple quantitative analysis. The course contents confectivity and Magnetism.	us physical phenon	nena in daily life		
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 describe and distinguish the concepts and principles in introductory s CLO 2 recognize the underlying physical principles behind various daily life CLO 3 explain physical phenomena using proper physical laws and theories CLO 4 apply simple mathematical techniques for quantitative analysis in sol	phenomena	ns		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL  Not for students with level 3 or above in HKDSE Physics; and  Not for students who have passed in PHYS1050, or already enrolled in this co  Not for students who have passed in PHYS1250, or already enrolled in this co				
Offer in 2017 - 2018	Y 1st sem Offer in 2018 - 2019 : Y	Examination	Dec		
Grade Descriptors	A Demonstrate thorough mastery at an advanced level of extensive knowledge a	nd skills required for att	aining all the course		

(A+ to F)			trong analytical and critical abilities and lo ar and unfamiliar situations. Apply highly o			
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	outcomes. Show evidence	ncomplete command of knowledge and of some analytical and critical abilities are oderately effective organizational and presi-	nd logical thinking, and ability to		
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	of analytical and critical at	dence of command of knowledge and skill bilities, logical and coherent thinking. Sh presentational skills are minimally effective	now very little or no ability to		
Course Type	Lecture-b	ased course				
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading / Self study			80		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	including in-class participation (10%)	20	CLO 1,2,3,4	
	Examinat	tion	2-hour written exam	50	CLO 1,2,3,4	
	Test			30	CLO 1,2,3,4	
Required/recommended	Lecture n	otes provided by Course	Coordinator			
reading and			Johnson: Introduction to Physics (		2013)	
online materials			cs (Addison Wesley, 2009, 11th e uille: College Physics (Brooks Col			
Course Website	http://mod	odle.hku.hk				

PHYS1250	Fundan	nental physics (6 cr	edits)	Academic Year	2017	
Offering Department	Physics		•	Quota		
Course Co-ordinator	Dr M K Y	ip, Physics (mankit@bo	hr.physics.hku.hk)			
Teachers Involved	\ \	Lee,Physics) Yip,Physics)				
Course Objectives	are planr	ning to take physics, as sics or astronomy as mi	tronomy, or mathematics/physi	emester. It serves as a first cours ics as major. It also serves stude ics are emphasized and the math	ents who intend t	
Course Contents & Topics		nclude: Mechanics, Wav ern Physics.	e Motions, Geometric and Phy	vsical Optics, Thermodynamics, I	Electromagnetism	
Course Learning	On succe	essful completion of this	course, students should be abl	e to:		
Outcomes	CLO 1 d	lescribe and explain the	fundamental physical principles	S		
	CLO 2 a	ipply these principles, to	gether with logical and mathem	natical reasoning, to situations of	the physical world	
	CLO 3 a	inalyse and solve proble	ms with the aids of mathematic	CS .		
	CLO 4 a	cquire and interpret exp	erimental data to examine the	physical laws		
Pre-requisites	Level 3 o	or above in HKDSE Phys	sics or equivalent;			
(and Co-requisites		without Level 3 or above	e in HKDSE Physics but havin	g a pass in PHYS1240 may be a	llowed to take th	
and Impermissible	course;					
combinations)		· · · · · · · · · · · · · · · · · · ·	d in PHYS1050, or already enr			
Offer in 2017 - 2018 Grade Descriptors		t sem 2nd sem Offer		Examination sive knowledge and skills required for a	Dec May	
(A+ to F)	<b>A</b>	learning outcomes. Show to apply knowledge to a presentational skills. Apply insightful conclusions.	strong analytical and critical abilities ar wide range of complex, familiar and u y highly effective lab skills and technic	nd logical thinking, with evidence of origin unfamiliar situations. Apply highly effecti ques. Critical use of data and results to	nal thought, and abilit ve organizational and draw appropriate an	
	В	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	D					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lar of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solv problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective is skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
Course Type		with laboratory compone				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures			36		
	Laborato	-			6	
	Tutorials				8	
	Reading	/ Self study			80	
				Weighting in final		
	Methods	S	Details	course grade (%)	Assessment Methods to CLO Mapping	
			Details			
Assessment Methods and Weighting	Methods	nents	Details  2-hour written exam	course grade (%)	Methods to CLO Mappin	

	Test		25	CLO 1,2,3		
Required/recommended	Lecture notes provided by Course	Coordinator				
reading and	Raymond A. Serway and John W.	aymond A. Serway and John W. Jewett: Physics for Scientists and Engineers (Thomson, 2011, 8th edition)				
online materials	James S. Walker: Physics (Prentic	e Hall, 2009, 4th edition)				
Course Website	http://moodle.hku.hk					

PHYS1650	Nature of	of the universe (6	credits)	Academic Year	r 2017	
Offering Department	Physics	,	·	Quota		
Course Co-ordinator	Dr K M Le	ee, Physics (kmlee@li	ly.physics.hku.hk)			
Teachers Involved	(Dr K M L	ee,Physics)				
Course Objectives			e is designed for students in all mathematics is required, but will		orior knowledge in	
Course Contents & Topics	our solar provides	system, and our ow students with a basic	ervational aspect of astronomy (in vn Sun, stars and their evolution understanding of the relationship its are expected to participate active	n, galaxies, blackholes, and c of astronomy to life and how or	osmology. It also ur nature works or	
Course Learning Outcomes	On succe CLO 1 id ga CLO 2 us CLO 3 re	essful completion of thi lentify and describe alaxies), and explain the se the celestial sphere eview the evolution o	s course, students should be able the major objects in our Solar heir main properties model to describe the apparent to the world-view from the geoc	e to: System and our universe (inc trajectories of celestial objects entric model to the heliocentric	cluding stars and	
	CLO 4 ap ur pr CLO 5 ex CLO 6 cc	pply quantitative phys niversal gravitation, D roblems xplain the evolution of	sion of the universe on our world-visical laws, including Kepler's the oppler shift formula and Hubble's stars and the evolution of the unitical problems and solutions using the control of the unitical problems.	ree laws of planetary motion, s law to calculate and solve sir verse	mple astronomical	
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2017 - 2018	Y 1st	t sem 2nd sem Off	er in 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	B C	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to far and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective observation skills techniques. Correct use of data of results to draw appropriate conclusions.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learn outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to refamiliar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective observations skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcored Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to a knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective observation skills and techniques. Limited ability to use data and results to draw appropriate conclusions.  Pamonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective.				
		Demonstrate little or no of analytical and critical problems. Organization observation skills and ted	evidence of command of knowledge and stabilities, logical and coherent thinking. and presentational skills are minimally echniques. Misuse of data and results and/o	esults to draw appropriate conclusions. skills required for attaining the course le. Show very little or no ability to apply ffective or ineffective. Apply minimally	v limited ability to apply Apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective	
	Lecture w	Demonstrate little or no e of analytical and critical problems. Organization observation skills and tec vith laboratory compon	evidence of command of knowledge and so I abilities, logical and coherent thinking and presentational skills are minimally e chniques. Misuse of data and results and/ lent course	esults to draw appropriate conclusions. skills required for attaining the course le. Show very little or no ability to apply ffective or ineffective. Apply minimally	v limited ability to apply Apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective is.	
Course Teaching	Lecture w	Demonstrate little or no of analytical and critical problems. Organization observation skills and tecvith laboratory compons	evidence of command of knowledge and stabilities, logical and coherent thinking. and presentational skills are minimally echniques. Misuse of data and results and/o	esults to draw appropriate conclusions. skills required for attaining the course le. Show very little or no ability to apply ffective or ineffective. Apply minimally	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective ss. No. of Hours	
Course Teaching	Lecture w Activities Lectures	Demonstrate little or no of analytical and critical problems. Organization observation skills and ted vith laboratory componess	evidence of command of knowledge and so I abilities, logical and coherent thinking and presentational skills are minimally e chniques. Misuse of data and results and/ lent course	esults to draw appropriate conclusions. skills required for attaining the course le. Show very little or no ability to apply ffective or ineffective. Apply minimally	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective is.  No. of Hours  36	
Course Teaching	Lecture w Activities Lectures Laborator	Demonstrate little or no of analytical and critical problems. Organization observation skills and tervith laboratory compones	evidence of command of knowledge and so I abilities, logical and coherent thinking and presentational skills are minimally e chniques. Misuse of data and results and/ lent course	esults to draw appropriate conclusions. skills required for attaining the course le. Show very little or no ability to apply ffective or ineffective. Apply minimally	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective is.  No. of Hours  36 12	
Course Teaching	Lecture w Activities Lectures Laborator Tutorials	Demonstrate little or no of analytical and critical problems. Organization observation skills and tecvith laboratory compones	evidence of command of knowledge and so I abilities, logical and coherent thinking and presentational skills are minimally e chniques. Misuse of data and results and/ lent course	esults to draw appropriate conclusions. skills required for attaining the course le. Show very little or no ability to apply ffective or ineffective. Apply minimally	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective is.  No. of Hours  36  12  8	
Course Teaching & Learning Activities	Lecture w Activities Lectures Laborator Tutorials Reading	Demonstrate little or no of analytical and critical problems. Organization observation skills and tecvith laboratory compones  orry  / Self study	evidence of command of knowledge and si a bilities, logical and coherent thinking, and presentational skills are minimally e chniques. Misuse of data and results and/o tent course  Details	esults to draw appropriate conclusions. skills required for attaining the course le Show very little or no ability to apply ffective or ineffective. Apply minimally or unable to draw appropriate conclusion	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective is.  No. of Hours  36  12  8  64	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activities Lectures Laborator Tutorials	Demonstrate little or no of analytical and critical problems. Organization observation skills and tecvith laboratory compones  orry  / Self study	evidence of command of knowledge and so I abilities, logical and coherent thinking and presentational skills are minimally e chniques. Misuse of data and results and/ lent course	esults to draw appropriate conclusions. skills required for attaining the course le. Show very little or no ability to apply ffective or ineffective. Apply minimally	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective is.  No. of Hours  36  12  8	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activities Lectures Laborator Tutorials Reading	Demonstrate little or no e of analytical and critical problems. Organization observation skills and tec- vith laboratory compones  ory  / Self study	evidence of command of knowledge and si a bilities, logical and coherent thinking, and presentational skills are minimally e chniques. Misuse of data and results and/o tent course  Details	esults to draw appropriate conclusions. skills required for attaining the course le Show very little or no ability to appl ffective or ineffective. Apply minimally or unable to draw appropriate conclusior  Weighting in final	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective is.  No. of Hours  36  12  8  64  Assessment Methods	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activities Lectures Laborator Tutorials Reading Methods	Demonstrate little or no e of analytical and critical problems. Organization observation skills and tecvith laboratory compones  Pry  / Self study  ents	evidence of command of knowledge and si a bilities, logical and coherent thinking, and presentational skills are minimally e chniques. Misuse of data and results and/o tent course  Details	esults to draw appropriate conclusions. skills required for attaining the course le Show very little or no ability to appl ffective or ineffective. Apply minimally or unable to draw appropriate conclusion  Weighting in final course grade (%)	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective as.  No. of Hours  36  12  8  64  Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Lecture w Activities Lectures Laborator Tutorials Reading Methods Assignme	Demonstrate little or no e of analytical and critical problems. Organization observation skills and tecvith laboratory compones  Pry  / Self study  ents	evidence of command of knowledge and so a billities, logical and coherent thinking and presentational skills are minimally echniques. Misuse of data and results and/cuent course  Details  Details	esults to draw appropriate conclusions. skills required for attaining the course le Show very little or no ability to apply ffective or ineffective. Apply minimally or unable to draw appropriate conclusion  Weighting in final course grade (%)	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective is.  No. of Hours  36  12  8  64  Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activities Lectures Laborator Tutorials Reading Methods  Assignme Examinat Test	Demonstrate little or no of analytical and critical problems. Organization observation skills and tecvith laboratory compones  Pry  / Self study  ents  ents  tion	evidence of command of knowledge and so a billities, logical and coherent thinking and presentational skills are minimally echniques. Misuse of data and results and/cuent course  Details  Details	esults to draw appropriate conclusions. skills required for attaining the course le Show very little or no ability to apply ffective or ineffective. Apply minimally or unable to draw appropriate conclusion  Weighting in final course grade (%)  25 50 25	v limited ability to apply apply partially effective arning outcomes. Lack y knowledge to solve effective or ineffective as.  No. of Hours  36  12  8  64  Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6	

PHYS2055	Introduc	ction to relativity (6 credits)  Academic Year	2017
Offering Department	Physics	Quota	
Course Co-ordinator	Dr K M Le	ee, Physics (kmlee@lily.physics.hku.hk)	
Teachers Involved	(Dr K M L	ee,Physics)	
Course Objectives		se aims at introducing students the essence of special relativity. It is designed as an ele iplines and all years with science background.	ective for students
Course Contents & Topics	Examples	clude: "Common-sense" concepts of space and time versus Einstein's conceptions of s of time dilation and space contraction, Paradoxes of relativity including the famous t in-the-barn", Four vectors and Lorentz invariant, Some discussion on general relativity.	
Course Learning	On succes	ssful completion of this course, students should be able to:	
Outcomes	CLO 1	recall the setup and significance of Michelson-Morley experiment	

	CLO 2	state the basic pos	stulates and the spacetime concept	t of special relativity		
	CLO 3		n and length contraction	<u> </u>		
	CLO 4	describe Lorentz tr	ransformation and its applications			
	CLO 5	state the resolution	of the twin and pole-in-the-barn p	aradoxes		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Pl	HYS1050 or PHYS1	150 or PHYS1250			
Offer in 2017 - 2018	Y 2nd	d sem Offer in 201	8 - 2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	learning outcomes. Sh	mastery at an advanced level of extension strong analytical and critical abilities and a wide range of complex, familiar and u	nd logical thinking, with evidence of or	iginal thought, and ability	
	В	learning outcomes. She	ial command of a broad range of knowledgow evidence of analytical and critical abilitie tuations. Apply effective organizational and	es and logical thinking, and ability to ap		
	С					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no of analytical and critic	o evidence of command of knowledge and cal abilities, logical and coherent thinking n and presentational skills are minimally effe	skills required for attaining the course . Show very little or no ability to ap		
Course Type	Lecture-b	ased course	, , , , , , , , , , , , , , , , , , , ,			
Course Teaching	Activities	S	Details	No. of Hours		
& Learning Activities						
	Lectures				36	
& Learning Activities	Lectures					
& Learning Activities	Tutorials	/ Self study			36	
Assessment Methods	Tutorials	,	Details	Weighting in final course grade (%)	36 12	
Assessment Methods	Tutorials Reading	,	Details		36 12 80 Assessment Methods	
Assessment Methods	Tutorials Reading / Methods	ents	Details  2-hour written exam	course grade (%)	36 12 80 Assessment Methods to CLO Mapping	
Assessment Methods	Tutorials Reading / Methods	ents		course grade (%)	36 12 80 Assessment Methods to CLO Mapping CLO 2,4	
& Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Tutorials Reading / Methods  Assignme Examinat Test Lecture no Robert Re 1992, 2nd Edwin F.	ents tion otes provided by Co esnick and David H d revised edition) Taylor and John A. N	2-hour written exam	course grade (%)  25  50  25  vity and Early Quantum Theo	36 12 80 Assessment Methods to CLO Mapping CLO 2,4 CLO 1,2,3,4,5 CLO 1,2,3,4,5	
Assessment Methods and Weighting  Required/recommended reading and	Tutorials Reading / Methods  Assignme Examinat Test Lecture no Robert Re 1992, 2nd Edwin F. 2nd editio	ents tion otes provided by Co esnick and David H d revised edition) Taylor and John A. N	2-hour written exam urse Coordinator lalliday: Basic Concepts in Relativ	course grade (%)  25  50  25  vity and Early Quantum Theo	36 12 80 Assessment Methods to CLO Mapping CLO 2,4 CLO 1,2,3,4,5 CLO 1,2,3,4,5	

PHYS2150	Method	ds in physics I (6 cre	edits)	Academic Year	2017			
Offering Department	Physics			Quota				
Course Co-ordinator	Dr F K C	Chow, Physics (judychow	r@hku.hk)					
Teachers Involved	(Dr F K (	Chow, Physics)						
Course Objectives			vith experience in using mathemat r may also be followed by Methods		solve problems in			
Course Contents & Topics	circuit the Cartesian Taylor s coordina	Solutions of ordinary differential equations in first and second orders and their applications in particle dynamics, circuit theories and nuclear physics; Principles of vectors; Analytic geometry in three dimensions; Vector functions; Cartesian, cylindrical and spherical coordinates; Partial derivatives, extremes of multi-variable functions and the Taylor series in two-variable functions; Double and triple integrals in Cartesian, cylindrical and spherical coordinates; Change of variables and the Jacobians; Calculations of centers of mass, moments of inertia, and electric potentials.						
Course Learning	On succe	essful completion of this	course, students should be able to	:				
Outcomes	CLO 1 r	review the theory and pri	inciples of mathematical methods a	ind compare the features of va	arious methods			
	CLO 2	describe the connections	s between mathematical equations	and physical problems				
	CLO 3 state and set up mathematical equations to describe the dynamics and evolution of physics systems							
	CLO 4 demonstrate knowledge of choosing correct solution of mathematical equations							
	CLO 5 i	interpret and judge the p	hysical meaning of result after calc	ulations				
Pre-requisites (and Co-requisites and Impermissible combinations)			3 or MATH1851 or PHYS1150					
Offer in 2017 - 2018	Y 1s	st sem Offer in 2018 - 2	2019 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	Α	learning outcomes. Show	astery at an advanced level of extensive k strong analytical and critical abilities and lo					
(A. 101)		to apply knowledge to fam.	iliar and unfamiliar situations. Apply highly e	ffective organizational and presentati				
(A' 101)	В	Demonstrate substantial of learning outcomes. Show e		nd skills required for attaining at lean do logical thinking, and ability to apply	onal skills. st most of the course			
(A. 101)	С	Demonstrate substantial c learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence	iliar and unfamiliar situations. Apply highly e command of a broad range of knowledge a evidence of analytical and critical abilities an	nd skills required for attaining at lea d logical thinking, and ability to apply sentational skills, skills required for attaining most of Id logical thinking, and ability to app	onal skills. st most of the course knowledge to familiar			
(A. 101)		Demonstrate substantial of learning outcomes. Show of and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lir Show evidence of some or	iliar and unfamiliar situations. Apply highly e command of a broad range of knowledge a evidence of analytical and critical abilities an ions. Apply effective organizational and pres incomplete command of knowledge and e of some analytical and critical abilities an	nd skills required for attaining at lea d logical thinking, and ability to apply sentational skills. skills required for attaining most of id logical thinking, and ability to app entational skills. quired for attaining some of the cours analytical and critical abilities. Show	onal skills.  st most of the course knowledge to familiar  the course learning ly knowledge to most se learning outcomes.			
(A. 101)	С	Demonstrate substantial of learning outcomes. Show of and some unfamiliar situation outcomes. Show evidence familiar situations. Apply memonstrate partial but lir Show evidence of some or knowledge to solve problet Demonstrate little or no ev of analytical and critical	iliar and unfamiliar situations. Apply highly e command of a broad range of knowledge a evidence of analytical and critical abilities an ions. Apply effective organizational and pres- incomplete command of knowledge and e of some analytical and critical abilities an noderately effective organizational and prese mited command of knowledge and skills recoherent and logical thinking, but with limited	and skills required for attaining at lea ad logical thinking, and ability to apply sentational skills. skills required for attaining most of all logical thinking, and ability to apply entational skills. puired for attaining some of the cours analytical and critical abilities. Show ational and presentational skills. serequired for attaining the course lea sow very little or no ability to apply	onal skills.  st most of the course t knowledge to familiar the course learning ly knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack			
,	C D Fail	Demonstrate substantial of learning outcomes. Show of and some unfamiliar situation outcomes. Show evidence familiar situations. Apply memonstrate partial but lir Show evidence of some or knowledge to solve problet Demonstrate little or no ev of analytical and critical	iliar and unfamiliar situations. Apply highly e command of a broad range of knowledge a evidence of analytical and critical abilities an ions. Apply effective organizational and pres- incomplete command of knowledge and e of some analytical and critical abilities an noderately effective organizational and prese mited command of knowledge and skills rec- oherent and logical thinking, but with limited ms. Apply limited or barely effective organiz- ridence of command of knowledge and skills abilities, logical and coherent thinking. Sh	and skills required for attaining at lea ad logical thinking, and ability to apply sentational skills. skills required for attaining most of all logical thinking, and ability to apply entational skills. puired for attaining some of the cours analytical and critical abilities. Show ational and presentational skills. serequired for attaining the course lea sow very little or no ability to apply	onal skills.  st most of the course t knowledge to familiar the course learning ly knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack			
Course Type	C D Fail	Demonstrate substantial of learning outcomes. Show e and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve probled Demonstrate little or no ev of analytical and critical problems. Organization an based course	iliar and unfamiliar situations. Apply highly e command of a broad range of knowledge a evidence of analytical and critical abilities an ions. Apply effective organizational and pres- incomplete command of knowledge and e of some analytical and critical abilities an noderately effective organizational and prese mited command of knowledge and skills rec- oherent and logical thinking, but with limited ms. Apply limited or barely effective organiz- ridence of command of knowledge and skills abilities, logical and coherent thinking. Sh	and skills required for attaining at lea ad logical thinking, and ability to apply sentational skills. skills required for attaining most of all logical thinking, and ability to apply entational skills. puired for attaining some of the cours analytical and critical abilities. Show ational and presentational skills. serequired for attaining the course lea sow very little or no ability to apply	onal skills.  st most of the course t knowledge to familiar the course learning ly knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack			
Course Type Course Teaching & Learning Activities	C D Fail	Demonstrate substantial of learning outcomes. Show e and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve probled Demonstrate little or no ev of analytical and critical problems. Organization an based course	iliar and unfamiliar situations. Apply highly e command of a broad range of knowledge a evidence of analytical and critical abilities an ions. Apply effective organizational and pres- incomplete command of knowledge and e of some analytical and critical abilities an noderately effective organizational and prese mitted command of knowledge and skills rec- berent and logical thinking, but with limited ms. Apply limited or barely effective organiz- ridence of command of knowledge and skills abilities, logical and coherent thinking. Sh d presentational skills are minimally effective	and skills required for attaining at lea ad logical thinking, and ability to apply sentational skills. skills required for attaining most of all logical thinking, and ability to apply entational skills. puired for attaining some of the cours analytical and critical abilities. Show ational and presentational skills. serequired for attaining the course lea sow very little or no ability to apply	onal skills. st most of the course t knowledge to familiar the course learning ly knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack knowledge to solve			

	Reading / Self study			80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		15	CLO 1,2,3,4,5
	Examination	2 hour written exam	50	CLO 2,3,4
	Test		35	CLO 1,2,3,4
Required/recommended reading and online materials	M. R. Spiegel: Schaum's Or Susan J. Colley: Vector Cal K. F. Riley, M. P. Hobson, a	Course Coordinator B. Thomas: University Calculus: Ea utiline of Advanced Mathematics for Elculus (Pearson, 2011, 4th edition) and S. J. Bence: Mathematical Methoty Press, 2006, 3rd edition)	Engineers and Scientists (McG	raw-Hill, 2009)
Course Website	http://moodle.hku.hk			

	Methods	s in physics II (6 o	credits)	Academic Ye	ar 2017
Offering Department	Physics		,	Quota	
Course Co-ordinator	Dr F K Ch	ow, Physics (judycho	ow@hku.hk)		
Teachers Involved	(Dr F K Ch	now,Physics)	,		
Course Objectives	This cours	se provides students	with experience in using mathe or may also be taken after Metho		o solve problems in
Course Contents & Topics	A review surface in and the Selectrodyn	on coordinate syste tegrals and volume Stokes' theorem; Cu namics; Matrix algebr	ms in three dimensions; Gradier integrals; Conservative fields and rivilinear coordinates; Application a; Properties of some special ma onalization of matrices; Application	nt, divergence, curl and Laplad d potentials; Green's theorem, ns of vector calculus in classi trices: Hermitian matrices and u	divergence theorem cal mechanics and unitary matrices, etc
Course Learning		•	is course, students should be abl		
Outcomes	CLO 1 re	view the theory and	principles of mathematical method	ds and compare the features of	various methods
			ns between mathematical equation	1 7 1	
	CLO 3 sta	ate and set up mathe	ematical equations to describe the	e dynamics and evolution of phy	sics systems
	CLO 4 de	emonstrate knowledg	ge of choosing correct solution of a	mathematical equations	
	CLO 5 sc	olve various problems	s and operate the calculations with	h computer	
	CLO 6 inf	terpret and judge the	physical meaning of result after of	calculations	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ma	ATH1011 or MATH1	013 or MATH1851 or PHYS1150		
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018	3 - 2019 : Y	Examination	May
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course				
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.  D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking, Show very little or no ability to apply knowledge to solve				
		Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critical	limited command of knowledge and skill coherent and logical thinking, but with lin lelms. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking	s required for attaining some of the co nited analytical and critical abilities. Sh janizational and presentational skills. skills required for attaining the course j. Show very little or no ability to ap	ow limited ability to apply learning outcomes. Lack
	Fail	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critical problems. Organization	limited command of knowledge and skill coherent and logical thinking, but with lin plems. Apply limited or barely effective org evidence of command of knowledge and	s required for attaining some of the co nited analytical and critical abilities. Sh janizational and presentational skills. skills required for attaining the course j. Show very little or no ability to ap	ow limited ability to apply learning outcomes. Lack
	Fail Lecture-ba	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critical problems. Organization ased course	limited command of knowledge and skill coherent and logical thinking, but with lin lolems. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff	s required for attaining some of the co nited analytical and critical abilities. Sh janizational and presentational skills. skills required for attaining the course j. Show very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve
Course Teaching	Fail Lecture-ba	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critical problems. Organization ased course	limited command of knowledge and skill coherent and logical thinking, but with lin lelms. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking	s required for attaining some of the co nited analytical and critical abilities. Sh janizational and presentational skills. skills required for attaining the course j. Show very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve
Course Teaching	Fail Lecture-ba Activities Lectures	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critical problems. Organization ased course	limited command of knowledge and skill coherent and logical thinking, but with lin lolems. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff	s required for attaining some of the co nited analytical and critical abilities. Sh janizational and presentational skills. skills required for attaining the course j. Show very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36
Course Teaching	Fail  Lecture-ba  Activities Lectures Tutorials	Show evidence of some knowledge to solve prot Demonstrate little or no of analytical and critics problems. Organization ased course	limited command of knowledge and skill coherent and logical thinking, but with lin lolems. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff	s required for attaining some of the co nited analytical and critical abilities. Sh janizational and presentational skills. skills required for attaining the course j. Show very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36  12
Course Teaching & Learning Activities	Fail  Lecture-ba Activities Lectures Tutorials Reading /	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critical problems. Organization ased course	limited command of knowledge and skill coherent and logical thinking, but with lin plems. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff	s required for attaining some of the co- nice of analytical and critical abilities. Sh- panizational and presentational skills. skills required for attaining the course j. Show very little or no ability to ap- ective or ineffective.	ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36  12  80
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba  Activities Lectures Tutorials	Show evidence of some knowledge to solve prot Demonstrate little or no of analytical and critics problems. Organization ased course	limited command of knowledge and skill coherent and logical thinking, but with lin lolems. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff	s required for attaining some of the co nited analytical and critical abilities. Sh janizational and presentational skills. skills required for attaining the course j. Show very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36  12
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading /	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critica problems. Organization ased course	limited command of knowledge and skill coherent and logical thinking, but with lin plems. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff	s required for attaining some of the content of the analytical and critical abilities. She planizational and presentational skills. skills required for attaining the course process. Show very little or no ability to appective or ineffective.  Weighting in final	ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36  12  80  Assessment Methods
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading / Methods	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critica problems. Organization ased course  Self study	limited command of knowledge and skill coherent and logical thinking, but with lin plems. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff	s required for attaining some of the control analytical and critical abilities. She jamizational and presentational skills. skills required for attaining the course j. Show very little or no ability to apective or ineffective.  Weighting in final course grade (%)	ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours 36 12 80  Assessment Methods to CLO Mapping
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critica problems. Organization ased course  Self study	limited command of knowledge and skill coherent and logical thinking, but with lin lolems. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff     Details	s required for attaining some of the control analytical and critical abilities. She janizational and presentational skills. skills required for attaining the course j. Show very little or no ability to apective or ineffective.  Weighting in final course grade (%)	ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours 36 12 80  Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Fail  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinati Test Lecture no J. Hass, M 2nd edition Susan J. ( James Ste C.R. Wylie Stephen W	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critical problems. Organization ased course of Self study  Y Self study  The sents ion of the self self study  The sents ion of the self self self self self study  The sents ion of the self self self self self self self sel	limited command of knowledge and skill coherent and logical thinking, but with lin lolems. Apply limited or barely effective org evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff     Details	s required for attaining some of the content of the analytical and critical abilities. Shipping and presentational skills. Skills required for attaining the course process. Show very little or no ability to appective or ineffective.  Weighting in final course grade (%)  15 50 35  ranscendentals (Pearson Educe of the delition) se (McGraw Hill, 1995, 6th edition delinear Algebra (Pearson, 20)	No. of Hours  No. of Hours  36  12  80  Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 2,3,4 CLO 2,3,4 cation Limited, 2014

PHYS2250	Introductory mechanics (6 credits)	Academic Year	2017
Offering Department	Physics	Quota	
Course Co-ordinator	Dr M K Yip, Physics (mankit@bohr.physics.hku.hk)		
Teachers Involved	(Dr J H C Lee,Physics) (Dr M K Yip,Physics)		
Course Objectives	This course covers the foundation of mechanics in one semester. It serves as	a core course for	students who are

		to take physics, astronous as minor. Both conceptua	al ideas and mathematical treatn	nent in mechanics are empha		
Course Contents & Topics	Conserva Momentu	ation, Variable Mass Pro um and its Conservation	ewton's Laws of Motion and oblems, System of Particles and Work, Energy and its Conservas' Principle and Buoyancy, Ber	d Centre of Mass, Torque ar ation, Gravitation, Simple Harr	nd Rotation, Angula monic Motions, Flui	
Course Learning	On succe	essful completion of this	course, students should be able	to:		
Outcomes	CLO 1 describe and explain the fundamental physical principles					
	CLO 2 a	apply these principles, to	gether with logical and mathema	itical reasoning, to situations of	of the physical world	
	CLO 3 a	analyse and solve proble	ms with the aids of mathematics			
	CLO 4 a	acquire and interpret exp	erimental data to examine the pl	nysical laws		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	PHYS1050 or PHYS1250	)			
Offer in 2017 - 2018	Y 1s	t sem 2nd sem Offer	in 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	A	learning outcomes. Show s to apply knowledge to a v	stery at an advanced level of extensiver of analytical and critical abilities and wide range of complex, familiar and ure highly effective lab skills and techniques.	I logical thinking, with evidence of or familiar situations. Apply highly effe	iginal thought, and ability	
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
		skilis and techniques, iviisu	oc of data and results and/or anable to t	iraw appropriate conclusions.	effective or ineffective lal	
Course Type	Lecture v	with laboratory compone		iraw appropriate conclusions.	effective or ineffective lal	
Course Teaching	Lecture w	with laboratory compone		iraw appropriate conclusions.	No. of Hours	
Course Teaching	1	with laboratory compone	nt course	iraw appropriate conclusions.		
Course Teaching	Activitie Lectures Laborato	with laboratory componed es s ory	nt course	raw appropriate conclusions.	<b>No. of Hours</b> 36 6	
Course Teaching	Activitie Lectures Laborato Tutorials	with laboratory compone es s ory	nt course	raw appropriate conclusions.	No. of Hours 36 6 8	
Course Teaching & Learning Activities	Activitie Lectures Laborato Tutorials	with laboratory componed es s ory	nt course	raw appropriate conclusions.	<b>No. of Hours</b> 36 6	
Course Teaching & Learning Activities  Assessment Methods	Activitie Lectures Laborato Tutorials Reading Methods	with laboratory compone es s cry s / Self study s	nt course	Weighting in final course grade (%)	No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping	
Course Teaching Learning Activities Assessment Methods	Activitie Lectures Laborato Tutorials Reading	with laboratory compone es s cry s / Self study s	nt course   Details	Weighting in final course grade (%)	No. of Hours 36 6 8 80 Assessment Methods	
Course Teaching Learning Activities Assessment Methods	Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	with laboratory compone  ss s cry s / Self study s ments	nt course   Details	Weighting in final course grade (%)  10 50	No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3	
Course Teaching Learning Activities Assessment Methods	Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	with laboratory compone  ss s cry s / Self study s	nt course  Details  Details	Weighting in final course grade (%)  10 50 15	No. of Hours  36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3 CLO 1,4	
Course Teaching & Learning Activities  Assessment Methods	Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	with laboratory compone  ss s cry s / Self study s ments	nt course  Details  Details	Weighting in final course grade (%)  10 50	No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3	
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Activitie Lectures Laborato Tutorials Reading Methods  Assignm Examina Laborato Test Lecture n P.A Tiple	with laboratory componer  ps  s  pry  s  / Self study  s  ments  attion  pry reports  motes provided by Course  ar and G. Mosca: Physics  rand G. Mosca: Physics	Details  Details  2-hour written exam	Weighting in final course grade (%)  10 50 15 25  Freeman, 2008, 6th edition).	No. of Hours  36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3 CLO 1,4 CLO 1,2,3	

PHYS2255	Introduct	ory electricity	and magr	netism (6 c	redits)		Academic Year	2017
Offering Department	Physics				·		Quota	
Course Co-ordinator	Dr J C S P	ın, Physics (jcsp	un@hku.hk)					
Teachers Involved	(Dr J C S F	un,Physics)						
Course Objectives	students w	ho are planning	to take phys s as minor.	ics, astronon	ny, or mathen	natics/physics		a core course for b serves students n electricity and
Course Contents & Topics	Electric pot		d potential, C	apacitance a	nd DC circuit	s, Magnetic f	orce, Magnetic fie	ectric conductors, eld, Faraday's law
Course Learning	On success	sful completion o	f this course,	students sho	uld be able to	):		
Outcomes	CLO 1 des	CLO 1 describe and explain the fundamental physical principles						
	CLO 2 apply these principles, together with logical and mathematical reasoning, to situations of the physical world							
	CLO 3 analyse and solve problems with the aids of mathematics							
	CLO 4 acc	uire and interpre	t experiment	al data to exa	mine the phy	sical laws		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in PH	YS1050 or PHYS	S1250					
Offer in 2017 - 2018	Y 2nd	sem Offer in 20	)18 - 2019 : Y	<u> </u>			Examination	May
Grade Descriptors (A+ to F)	Α	learning outcomes. to apply knowledge	Show strong and to a wide rang . Apply highly e	alytical and critic e of complex, f	al abilities and lo amiliar and unfa	ogical thinking, w miliar situations.	skills required for att vith evidence of original Apply highly effective data and results to co	al thought, and ability e organizational and
	В	learning outcomes.	Show evidence of	of analytical and	critical abilities a	nd logical thinkin	ed for attaining at leasing, and ability to apply s. Apply effective lab	knowledge to familiar

		Correct use of data of result	s to draw appropriate conclusions.		
	С	outcomes. Show evidence of familiar situations. Apply mo	of some analytical and critical abilit oderately effective organizational an	e and skills required for attaining mos ties and logical thinking, and ability to and presentational skills. Apply moderate results to draw appropriate conclusions.	apply knowledge to most ely effective lab skills and
	D	Demonstrate partial but limit Show evidence of some con- knowledge to solve problem	ted command of knowledge and ski nerent and logical thinking, but with I	ills required for attaining some of the crimited analytical and critical abilities. Shorganizational and presentational skills	ourse learning outcomes.
	Fail	of analytical and critical abproblems. Organization and	pilities, logical and coherent thinkin	d skills required for attaining the course ng. Show very little or no ability to ap effective or ineffective. Apply minimally to draw appropriate conclusions.	oply knowledge to solve
Course Type	Lecture wi	th laboratory componen	t course		
Course Teaching	Activities	•	Details		No. of Hours
& Learning Activities	Lectures				36
	Laboratory			6	
	Tutorials				8
	Reading / Self study				80
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	nts		10	CLO 1,2,3,4
	Examinat	on	2-hour written exam	50	CLO 1,2,3
	Laborator	y reports		15	CLO 1,4
	Test			25	CLO 1,2,3
Required/recommended reading and online materials	R. D. Knig R. Resnic	ht: Physics for Scientists	s and Engineers (Pearson, 20 ane: Physics Volume 2 (Johr	s (Freeman, 2008, 6th edition) 008, 2nd edition) n Wiley and Sons, 2002, 5th edit ers (Thomson, 2004, 5th edition	
Course Website	http://moo	dle.hku.hk			

PHYS2260	Heat a	Heat and waves (6 credits)  Academic Year 2017  Physics  Quota					
Offering Department	Physics	, ,		Quota			
Course Co-ordinator	Dr M Su	, Physics (mengsu84@hki	u.hk)				
Teachers Involved	(Dr M Sı	u,Physics)					
Course Objectives	This cou	irse covers the foundation	of heat and waves in one semester. It serve	s as a core course	for students who		
	are plan	ning to take physics, astro	onomy, or mathematics/physics as major. It	also serves studer	nts who intend to		
			ptual ideas and mathematical treatment in he				
Course Contents & Topics	a stretch equation resonan- interfere and equ energy, gas, Mo including	ned string as an example n, Energy in wave motion ce, Beats, The Doppler E- nce, Interference from thin illibrium, Ideal gas law, Mo Concept of heat, First law olar heat capacities at condition g adiabatic, isothermal, co	usoidal wave including transverse velocity and for transverse wave, Sound wave as an exit, The principle of superposition, Interferent ffect, Light wave as an electromagnetic waven films, Single slit diffraction, Multiple slit and oblecular view of pressure, Mean free path, of thermodynamic, Work done on or by an isonstant volume and constant pressure, Donstant-volume, cyclical and free expansion, of thermodynamic, Carnot engine, Statistical values.	cample for longitud ce of waves, Stan e, Reflection, Refra d grating, Polarizat iistributions of mole deal gas, Internal of the iifferent thermodyn Reversibility of prod	inal wave, Wave, ding waves and action, Double sli ion, Temperature ecular speed and energy of an idea amic processes		
Course Learning		•	ourse, students should be able to:	now or ona opy.			
Outcomes			undamental physical principles				
				n to situations of th	ne physical world		
		CLO 2 apply these principles, together with logical and mathematical reasoning, to situations of the physical world CLO 3 analyse and solve problems with the aids of mathematics					
	CLO 4 acquire and interpret experimental data to examine the physical laws						
(and Co-requisites and Impermissible combinations)		0,500,000	V0. V				
Offer in 2017 - 2018		st sem Offer in 2018 - 20		Examination	Dec		
Grade Descriptors (A+ to F)	В						
		learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
		D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.					
	Fail	of analytical and critical ab problems. Organization and	ence of command of knowledge and skills required for a illities, logical and coherent thinking. Show very little presentational skills are minimally effective or ineffective e of data and results and/or unable to draw appropriate	or no ability to apply e. Apply minimally effect	knowledge to solve		
		skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
	Lecture	skills and techniques. Misuse with laboratory component					
Course Teaching	Lecture Activitie	with laboratory componen			No. of Hours		
Course Teaching	<b>Activition</b> Lectures	with laboratory component es s	t course		36		
Course Teaching	Activitie Lectures Laborate	with laboratory componentes es s ory	t course		36 6		
Course Type Course Teaching & Learning Activities	Activition Lectures Laborate Tutorials	with laboratory componentes es s ory	t course		36		

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,2,3,4
	Examination	2-hour written exam	50	CLO 1,2,3
	Laboratory reports		15	CLO 1,4
	Test		25	CLO 1,2,3
Required/recommended reading and online materials	R. Resnick, D. Halliday, and K. Kr	s for Scientists and Engineers (Free ane: Physics Volume 1 (John Wiley ane: Physics Volume 2 (John Wiley	and Sons, 2002, 5th editi	

	Modern	physics (6 credits)		Academic Ye	ar 2017	
Offering Department	Physics			Quota		
Course Co-ordinator	Dr F K Ch	low, Physics (judychow	@hku.hk)	·		
Teachers Involved		how,Physics) Chau,Physics)	-			
Course Objectives	are planni	ing to take physics, ast	n of modern physics in one ser tronomy, or mathematics/physic eptual ideas and mathematical	cs as major. It also serves stu	dents who intend to	
Course Contents & Topics			ies of Wave, Wave Propertie chrodinger Equation, The Hydro			
Course Learning		•	course, students should be able		<b>,</b>	
Outcomes	CLO 2 ap	CLO 1 describe and explain the fundamental physical principles CLO 2 apply these principles, together with logical and mathematical reasoning, to situations of the physical world CLO 3 analyse and solve problems with the aids of mathematics CLO 4 acquire and interpret experimental data to examine the physical laws				
Pre-requisites (and Co-requisites and Impermissible combinations)		HYS1050 or PHYS1250		,		
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offer	in 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	Α	learning outcomes. Show sto apply knowledge to a v	stery at an advanced level of extensi strong analytical and critical abilities an wide range of complex, familiar and u r highly effective lab skills and techniq	nd logical thinking, with evidence of original familiar situations. Apply highly effectively	ginal thought, and ability ctive organizational and	
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.				
		Damanatrata little ar ne avi			Apply partially effective	
	Fail	of analytical and critical a problems. Organization and		skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e	Apply partially effective learning outcomes. Lack ply knowledge to solve	
		of analytical and critical a problems. Organization and	idence of command of knowledge and abilities, logical and coherent thinking d presentational skills are minimally eff se of data and results and/or unable to	skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e	Apply partially effective learning outcomes. Lack ply knowledge to solve	
Course Teaching		of analytical and critical a problems. Organization an- skills and techniques. Misu ith laboratory compone	idence of command of knowledge and abilities, logical and coherent thinking d presentational skills are minimally eff se of data and results and/or unable to	skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e	Apply partially effective learning outcomes. Lack ply knowledge to solve	
Course Teaching	Lecture w	of analytical and critical a problems. Organization an- skills and techniques. Misu ith laboratory compone	idence of command of knowledge and abilities, logical and coherent thinking of presentational skills are minimally eff se of data and results and/or unable to nt course	skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e	Apply partially effective learning outcomes. Lack ply knowledge to solve ffective or ineffective late	
Course Teaching	Lecture w	of analytical and critical a problems. Organization and skills and techniques. Misu ith laboratory componer	idence of command of knowledge and abilities, logical and coherent thinking of presentational skills are minimally eff se of data and results and/or unable to nt course	skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e	Apply partially effective learning outcomes. Lack ply knowledge to solve ffective or ineffective late No. of Hours	
Course Teaching	Lecture w Activities Lectures Laborator Tutorials	of analytical and critical a problems. Organization an skills and techniques. Misu ith laboratory componer s	idence of command of knowledge and abilities, logical and coherent thinking of presentational skills are minimally eff se of data and results and/or unable to nt course	skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e	Apply partially effective learning outcomes. Lack ply knowledge to solve ffective or ineffective late.  No. of Hours  36 6 8	
Course Teaching	Lecture w Activities Lectures Laborator Tutorials	of analytical and critical a problems. Organization and skills and techniques. Misu ith laboratory componer	idence of command of knowledge and abilities, logical and coherent thinking of presentational skills are minimally eff se of data and results and/or unable to nt course	skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e	Apply partially effective learning outcomes. Lack ply knowledge to solve ffective or ineffective lat   No. of Hours  36 6	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activities Lectures Laborator Tutorials	of analytical and critical a problems. Organization an skills and techniques. Misu ith laboratory componer s	idence of command of knowledge and abilities, logical and coherent thinking of presentational skills are minimally eff se of data and results and/or unable to nt course	skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e	Apply partially effective learning outcomes. Lack ply knowledge to solve ffective or ineffective late.  No. of Hours  36 6 8	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activities Lectures Laborator Tutorials Reading	of analytical and critical a problems. Organization an skills and techniques. Misu ith laboratory componers	idence of command of knowledge and abilities, logical and coherent thinking d presentational skills are minimally eff se of data and results and/or unable to nt course  Details	skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e draw appropriate conclusions.  Weighting in final	Apply partially effective learning outcomes. Lack ply knowledge to solve ffective or ineffective late.  No. of Hours  36  6  8  80  Assessment Methods	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activities Lectures Laborator Tutorials Reading Methods	of analytical and critical a problems. Organization an skills and techniques. Misu ith laboratory componed it laboratory componed	idence of command of knowledge and abilities, logical and coherent thinking d presentational skills are minimally eff se of data and results and/or unable to nt course  Details	skills required for attaining the course . Show very little or no ability to ap fective or ineffective. Apply minimally e draw appropriate conclusions.  Weighting in final course grade (%)	Apply partially effective learning outcomes. Lack ply knowledge to solve ffective or ineffective late  No. of Hours  36  6  8  80  Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities  Assessment Methods	Lecture w Activities Lectures Laborator Tutorials Reading / Methods  Assignme Examinat Laborator	of analytical and critical a problems. Organization an skills and techniques. Misu ith laboratory componed ith state of the componed is a self-state of the componed is a self-state of the componed in the componed is a self-state of the componed in the co	idence of command of knowledge and abilities, logical and coherent thinking d presentational skills are minimally eff se of data and results and/or unable to nt course  Details  Details	skills required for attaining the course . Show very little or no ability to ap rective or ineffective. Apply minimally e draw appropriate conclusions.  Weighting in final course grade (%)  10 50 15	Apply partially effective learning outcomes. Lack ply knowledge to solve ffective or ineffective lat.  No. of Hours  36  6  8  80  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3 CLO 1,4	
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Lecture w Activities Lectures Laborator Tutorials Reading / Methods  Assignme Examinat Laborator Test Lecture nc R. Harris: K. Krane: R. A. Serv P. A. Tiple	of analytical and critical a problems. Organization an skills and techniques. Misu ith laboratory componers  Y Self study  A Self study  Ty reports  Otes provided by Course Modern Physics (Pears Modern Physics (Pears Modern Physics (John way, C. J. Moses, and Cer and G. Mosca: Physic g and R. Resnick: Qua	idence of command of knowledge and abilities, logical and coherent thinking of presentational skills are minimally eff se of data and results and/or unable to nt course  Details  Details  2-hour written exam	skills required for attaining the course. Show very little or no ability to apprective or inelftete or no ability to apprective or inelftete or no ability to apprective or inelftete or no ability to appreciate conclusions.  Weighting in final course grade (%)  10 50 15 25  n) prooks Cole, 2004, 3rd edition) Extended Version(Freeman, 20	Apply partially effective learning outcomes. Lack ply knowledge to solve ffective or ineffective lat.  No. of Hours  36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3 CLO 1,4 CLO 1,2,3	

PHYS2850	Atomic and nuclear physics (6 credits)	Academic Year	2017				
Offering Department	Physics	Quota					
Course Co-ordinator	Dr S Z Zhang, Physics (shizhong@hku.hk)						
Teachers Involved	(Dr S Z Zhang, Physics)						
Course Objectives	This course will introduce students to the fundamentals of atomic physics and rudimentary nuclear physics. It to provide a coherent and concise coverage of traditional atomic and nuclear physics. Important topics of cu research interest will be also discussed, such as laser cooling and trapping which plays an important role in realization of Bose-Einstein condensate in atomic vapors.						

Course Contents & Topics		Fopics include: Atomic structure of hydrogen and hydrogen-like atom, multi-electron atom, atom in electromagnetic lield, spectroscopy, laser trapping and cooling; nuclear structure, shell model and nuclear reactions. Applications of					
				nentioned when appropriate.			
Course Learning		n successful completion of this course, students should be able to:					
Outcomes		apply general consideration or		to atomic and nuclear system; ma	ke general orders of		
				g principle of laser trapping and cool	ina		
		ecognize the general feat			<b>J</b>		
				atures of simple nuclei, binding of de	uteron et al		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	ass in PHYS2265					
Offer in 2017 - 2018	N Of	ffer in 2018 - 2019 : N		Examination	ı		
Grade Descriptors (A+ to F)	A	learning outcomes. Show st to apply knowledge to a w	trong analytical and critical abi	extensive knowledge and skills required for ilities and logical thinking, with evidence of or ir and unfamiliar situations. Apply highly eff techniques. Critical use of data and results	riginal thought, and ability ective organizational and		
	В	*					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.						
Course Type	Lecture-k	pased course					
Course Teaching	Activitie	es .	Details		No. of Hours		
& Learning Activities	Lectures	3			36		
_	Tutorials	3			18		
	Reading	/ Self study			80		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents		20	CLO 1,2,3,4		
	Examina			50	CLO 1,2,3,4		
	Test			30	CLO 1,2,3,4		
Required/recommended reading and online materials	W. Demt K. Krane	roder, Atoms, molecules , Introductory nuclear phy	and photons (Springer, 2 sics (John Wiley & Sons				
Course Website		w.physics.hku.hk/~phys2	,	inologaica (i caraon, zna, 2003)			
Course Website	πιμ.//www	w.priysics.riku.rik/~priys2	.020/				

PHYS3150	Theoreti	ical physics (6 credits)	Academic Year	2017				
Offering Department	Physics		Quota					
Course Co-ordinator	Prof Z D V	Vang, Physics (zwang@hku.hk)						
Teachers Involved		Wang,Physics)						
Course Objectives		The aim of this course is to provide students with the conceptual skills and key analytical tools for solving real problems in all major areas of physics.						
Course Contents & Topics	integral fo equation, (Gamma	This course will introduce and address the following topics: Application of complex variables including the Cauchy's integral formula and calculus of residues, Partial differential equations (the general wave equation, the Schrodinger equation, the Poisson equation, and the diffusion equation), Properties of special functions widely used in Physics (Gamma functions, Beta functions, Bessel functions, spherical harmonics etc.), Fourier Series, and Fourier Transform.						
Course Learning	On succes	ssful completion of this course, students should be able to:						
Outcomes	CLO 1 ar	nalyse and examine the analytical properties of complex functi	ions					
	CLO 2 calculate various definite integrals using the method of residues							
	CLO 3 analyse and solve the first and second order ordinary equations, and typical partial differential equations							
	CLO 4 apply the special functions in handling various physical problems							
	CLO 5 use the Fourier Series and Fourier transform in describing, respectively, any periodic function and wave							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (P	PHYS2250 or PHYS2255 or PHYS2265) and (MATH2211 or P	PHYS2150)					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2019 : Y	Examination	Dec				
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.	thinking, with evidence of original	al thought, and ability				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete command of knowledge and skills outcomes. Show evidence of some analytical and critical abilities and log familiar situations. Apply moderately effective organizational and presentati	gical thinking, and ability to appl					
	D	Demonstrate partial but limited command of knowledge and skills required	d for attaining some of the cours	e learning outcomes.				

Course Type	Fail knowledge to Demonstrate of analytical a	e of some coherent and logical thinking, but with lin solve problems. Apply limited or barely effective org little or no evidence of command of knowledge and and critical abilities, logical and coherent thinking janization and presentational skills are minimally effe	panizational and presentational skills. skills required for attaining the course s. Show very little or no ability to ap	learning outcomes. Lack
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		20	CLO 1,2,3,4,5
	Examination	3-hour written exam	70	CLO 1,2,3,4,5
	Test		10	CLO 1,2,3,4,5
Required/recommended reading and online materials		l by Course Coordinator er: Mathematical Methods for Physicists ( <i>I</i>	Academic Press, 2005)	

PHYS3350	Classica	al mechanics (	6 credits)	Academic Yea	ar 2017		
Offering Department	Physics	,	•	Quota			
Course Co-ordinator	Dr S Z Zh	ang, Physics (shiz	zhong@hku.hk)				
Teachers Involved	(Dr S Z ZI	hang,Physics)					
Course Objectives	undergrad an electiv related te	Build on the foundation course PHYS2250, this course discusses classical mechanics in the advanced undergraduate level using Lagrangian formalism. It serves as a core course for physics major students as well as an elective core for those who are interested in gaining a deep understanding of classical mechanics and to apply related techniques in their own majors. This is also an essential course for those who plan to pursue postgraduate studies in physics or related disciplines. Both conceptual ideas and mathematical treatment are emphasized.					
Course Contents & Topics	This cours mechanic mechanic central fo	This course will be essentially divided into two parts. In the first part, fundamental concepts related to Lagrangian mechanics will be treated. Topics include the variational principle, conservation laws and its relation to Newtonian mechanics. In the second part, we shall discuss applications of the Lagrangian mechanics. Topics include the central force problem, the coupled harmonic oscillators and rigid-body dynamics. Lagrangian mechanics in non-inertial frame will also be discussed.					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand the logical structure of Lagrangian mechanics and its advantage over the Newtonian formulation;  CLO 2 write down the form of Lagrangian for a mechanical system and solve the dynamic equations in simple						
	CLO 3 ur	ases nderstand the gen	eral feature of a many-body syste	em and the role of center of mass			
Pre-requisites (and Co-requisites and Impermissible combinations)		as well as many-body and rigid body dynamics Pass in PHYS2250					
Offer in 2017 - 2018	Y 1st	sem Offer in 20	18 - 2019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	learning outcomes. to apply knowledge presentational skills insightful conclusion	Show strong analytical and critical abilities to a wide range of complex, familiar ar . Apply highly effective lab skills and teclis.	ensive knowledge and skills required for s and logical thinking, with evidence of orig nd unfamiliar situations. Apply highly effect hinques. Critical use of data and results t	ginal thought, and ability ctive organizational and o draw appropriate and		
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cou learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to fam and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and technique Correct use of data of results to draw appropriate conclusions.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to mos familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.					
	Fail	Demonstrate little or of analytical and criproblems. Organization	r no evidence of command of knowledge a ritical abilities, logical and coherent think	and skills required for attaining the course liking. Show very little or no ability to apply effective or ineffective. Apply minimally e	oly knowledge to solve		
Course Type	Lecture w	ith laboratory com	ponent course				
Course Teaching	Activities	s	Details		No. of Hours		
& Learning Activities	Lectures						
	Laborato	ry					
	Tutorials				8		
	Assessm	ent			80		
Assessment Methods	Methods		Details	Weighting in final	Assessment		
and Weighting	mounous		Dotano	course grade (%)	Methods to CLO Mapping		
	Assignme	ents		20	CLO 1,2,3		
	Examinat	tion	2-hour written exam	60	CLO 1,2,3		
				10	CLO 3		
		y -1		10	CLO 1,2,3		
Required/recommended reading and					, ,-		

PHYS3351	Quantu	m mechanics (6 d	credits)	Academic Ye	ear 2017			
Offering Department	Physics			Quota				
Course Co-ordinator	Prof W Y	ao, Physics (wangya	o@hku.hk)					
Teachers Involved	(Prof W Y	(Prof W Yao, Physics)						
Course Objectives	Build on the foundation course PHYS2265, this course discusses quantum mechanics in the advanced undergraduate level with rigorous mathematical treatment. It serves as a core course for physics major students as well as an elective core for those who are interested to gain a deep understanding of quantum mechanics and to apply related techniques in their own majors. This is also an essential course for those who plan to pursue postgraduate studies in physics or related disciplines. Both conceptual ideas and mathematical treatment are emphasized.							
Course Contents & Topics	Time-dependent Schrodinger equation; statistical interpretation of wave function; probability density; probability current and continuity equation; momentum; physical observable and expectation value; Heisenberg uncertainty principle; time-independent Schrodinger equation; Hamiltonian and stationary states; particle in a square well; transmission and reflection at a barrier; harmonic oscillator problem using ladder operators; free particle and wavepacket; delta function potential; Dirac notations; state vectors; Hilbert space; Hermitian operators; eigenstates and eigenvalues; generalized statistical interpretation; generalized uncertainty principle; angular momentum; hydrogen atom; atomic orbits; spin; non-degenerate perturbation theory.							
Course Learning	On succe	ssful completion of the	nis course, students should be abl	e to:				
Outcomes	a CLO 2 fo	nd uncertainty of phy ormulate energy eig	I interpretation of quantum mech sical observables envalue problems, and solve th	<u>,                                      </u>	•			
	CLO 3 fo		on of the wavefunction and the exp	pectation value of physical obs	ervables with know			
	CLO 4 ju	• • • • • • • • • • • • • • • • • • • •	y of time-independent perturbati perturbations applied to the physic		iding order energy			
	CLO 5 a	cquire and interpret e	experimental data to examine the	physical laws				
Pre-requisites and Co-requisites and Impermissible combinations)		HYS2265						
Offer in 2017 - 2018	Y 1st	sem Offer in 2018	- 2019 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	В	learning outcomes. She to apply knowledge to presentational skills. A insightful conclusions.  Demonstrate substantillearning outcomes. She	mastery at an advanced level of extens we strong analytical and critical abilities an a wide range of complex, familiar and upply highly effective lab skills and technical command of a broad range of knowled we evidence of analytical and critical abilities that the strength of the s	nd logical thinking, with evidence of or unfamiliar situations. Apply highly effeques. Critical use of data and results ge and skills required for attaining at as and logical thinking, and ability to a	riginal thought, and abilitiective organizational and to draw appropriate an least most of the courseply knowledge to familia			
	and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.							
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack						
	Fail	of analytical and critic problems. Organization skills and techniques. M	al abilities, logical and coherent thinking and presentational skills are minimally ef disuse of data and results and/or unable to	Show very little or no ability to apple to the sective or ineffective. Apply minimally	oply knowledge to solv			
Course Type		ith laboratory compo						
Course Teaching	Activitie		Details		No. of Hours			
Learning Activities	Lectures				36			
	Laborato				6 8			
	Tutorials							
		/ Self study			80			
ssessment Methods nd Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Assignm	ents		10	CLO 1,2,3,4			
	Examina	tion	2-hour written exam	60	CLO 1,2,3,4			
	Laborato	ry reports		10	CLO 5			
	Test			20	CLO 1,2,3,4			
Required/recommended reading and contine materials		otes provided by Cou fiths: Introduction to C	urse Coordinator Quantum Mechanics (Pearson Pre	ntice Hall, 2004, 2nd ed.)				
Course Website	http://mod	odle.hku.hk						

PHYS3450	Electromagnetism (6 credits)	Academic Year	2017
Offering Department	Physics	Quota	
Course Co-ordinator	Prof X D Cui, Physics (xdcui@hku.hk)		
Teachers Involved	(Prof X D Cui,Physics)		
Course Objectives	Build on the foundation course PHYS2255, this course discusses election undergraduate level with vigorous mathematical treatment. It serves as a core as well as an elective core for those who are interested to gain a deep understapply related techniques in their own majors. This is also an essential cour postgraduate studies in physics or related disciplines. Both conceptual ideas emphasized.	course for physic anding of electron se for those who	s major students nagnetism and to plan to pursue

Course Contents & Topics		Topics include electric fields and potential, methods in electrostatics, conductors and dielectrics, magnetostatics and electromagnetic induction, magnetic properties of materials and Maxwell's equations.					
Course Learning			ourse, students should be abl	•			
Outcomes		•	nysics in electrostatics and ma				
			o describe electrostatics and	•			
		. ,		atic and magnetic phenomena			
		•	rostatics in vacuum and in die				
			netism in vacuum and in mag				
	CLO 6 ap	ply essential skills of r	making measurements with	appropriate instruments in phediction of underlying physical			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Pl	Pass in PHYS2255					
Offer in 2017 - 2018	Y 2nd	2nd sem Offer in 2018 - 2019 : Y Examination May					
Grade Descriptors (A+ to F)	A	learning outcomes. Show str to apply knowledge to a wi	rong analytical and critical abilities a de range of complex, familiar and	sive knowledge and skills required for nd logical thinking, with evidence of or unfamiliar situations. Apply highly effe ques. Critical use of data and results	iginal thought, and ability ective organizational and		
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
	D Fail	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.					
		problems. Organization and		g. Show very little or no ability to ap fective or ineffective. Apply minimally of draw appropriate conclusions.			
Course Type	Lecture wi	th laboratory component	t course				
Course Teaching	Activities	<b>i</b>	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Laborator	у		6			
	Tutorials				8		
	Reading /	Self study			80		
Assessment Methods	Methods		Details	Weighting in final	Assessment		
and Weighting				course grade (%)	Methods to CLO Mapping		
	Assignme	ents		10	CLO 1,2,3,4,5,6		
	Examinat	ion	3-hour written exam	60	CLO 1,2,3,4,5		
	Laborator	y reports		10	CLO 1,6		
	Test			20	CLO 1,2,3,4,5		
Required/recommended reading and online materials		otes provided by Course ths: Introduction to Elect	Coordinator rodynamics, 3rd ed., (Prentice	e-Hall, 1999).	· · · · · · ·		
online materials							

PHYS3550	Statistica	al mechanics & thermodynamics (6 credits	5)	Academic Year	2017		
Offering Department	Physics			Quota			
Course Co-ordinator	Prof M H X	ie, Physics (mhxie@hku.hk)					
Teachers Involved	(Prof M H )	(ie,Physics)					
Course Objectives	advanced students a mechanics course for	Build on the foundation course PHYS2260, this course discusses statistical mechanics and thermodynamics in the advanced undergraduate level with vigorous mathematical treatment. It serves as a core course for physics major students as well as an elective core for those who are interested to gain a deep understanding of statistical mechanics and thermodynamics and to apply related techniques in their own majors. This is also an essential course for those who plan to pursue postgraduate studies in physics or related disciplines. Both conceptual ideas and mathematical treatment are emphasized.					
Course Contents & Topics	Disorder a	Topics include: Boltzmann, Fermi and Bose-Einstein statistics. Partition function and the laws of Thermodynamics. Disorder and entropy; concept of temperature; the free energy. Density of states. Classical gas, electrons in metals, and black body radiation. Heat capacities. Equilibrium and phase transition. Einstein and Debye solids.					
Course Learning Outcomes	CLO 1 des CLO 2 app CLO 3 and	On successful completion of this course, students should be able to:  CLO 1 describe and explain the fundamental physical principles  CLO 2 apply these principles, together with logical and mathematical reasoning, to situations of the physical world CLO 3 analyse and solve problems with the aids of mathematics  CLO 4 acquire and interpret experimental data to examine the physical laws					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ph	Pass in PHYS2260					
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2019 : Y		Examination	May		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of exter learning outcomes. Show strong analytical and critical abilities to apply knowledge to a wide range of complex, familiar and presentational skills. Apply highly effective lab skills and techn insightful conclusions.	and logical thinking, w unfamiliar situations.	rith evidence of original Apply highly effective	al thought, and ability e organizational and		
	В	Demonstrate substantial command of a broad range of knowle learning outcomes. Show evidence of analytical and critical abil and some unfamiliar situations. Apply effective organizational a	ities and logical thinkin	g, and ability to apply	knowledge to familiar		

	Correct use of data of resu	ılts to draw appropriate conclusions.			
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	Show evidence of some continuous knowledge to solve proble	nited command of knowledge and skills oherent and logical thinking, but with limitens. Apply limited or barely effective org imited ability to use data and results to c	ted analytical and critical abilities. Sh panizational and presentational skills	ow limited ability to apply	
	of analytical and critical a problems. Organization an	ridence of command of knowledge and s abilities, logical and coherent thinking. Id presentational skills are minimally effe use of data and results and/or unable to d	Show very little or no ability to apctive or ineffective. Apply minimally e	ply knowledge to solve	
Course Type	Lecture with laboratory compone	nt course			
Course Teaching	Activities	Details	Details		
& Learning Activities	Lectures		36		
	Laboratory			6	
	Tutorials			8	
	Reading / Self study			80	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		10	CLO 1,2,3	
	Examination	2-hour written exam	60	CLO 1,2,3	
	Laboratory reports		10	CLO 1,4	
	Test		20	CLO 1,2,3	
Required/recommended reading and online materials	Lecture notes provided by Cours Daniel V. Schroeder: An Introduc		n, 2014).		
Course Website	http://moodle.hku.hk				

PHYS3551	Introdu	ictory solid state p	physics (6 credits)	Academic Ye	ar 2017			
Offering Department	Physics			Quota				
Course Co-ordinator	Prof J G	ao, Physics (jugao@h	ku.hk)	· · · · · · · · · · · · · · · · · · ·				
Teachers Involved								
Course Objectives	is desigr	To provides a broad introduction to modern theories of the behaviour and properties of the solid state of matter. It is designed as a self-contained course which at the same time will serve as a basis for more advanced courses and projects in solid state physics.						
Course Contents & Topics	Lattice v	Crystal structures and symmetry. The formation of crystals. The reciprocal lattice and X-ray diffraction in crystals Lattice vibrations and thermal properties. Free-electron theory of metals. Energy bands; metals, semiconductors and insulators. If time permits, special topics such as superconductor will be briefly mentioned.						
Course Learning Outcomes	CLO 1	demonstrate knowledo	is course, students should be able ge for crystal structures and chara of solid matter and explain the un	cterization				
			es and mathematical equations to	, , , , , ,	s of materials			
			of making measurements with applications					
			ntal data and compare with the pro-		•			
Pre-requisites (and Co-requisites and Impermissible combinations)		PHYS2260 and PHYS	2265					
Offer in 2017 - 2018	N O	ffer in 2018 - 2019 : N		Examination				
Grade Descriptors (A+ to F)	A	learning outcomes. Sho to apply knowledge to	mastery at an advanced level of extensi w strong analytical and critical abilities an a wide range of complex, familiar and u poply highly effective lab skills and techniq	d logical thinking, with evidence of or infamiliar situations. Apply highly effe	ginal thought, and abilit ctive organizational and			
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.						
	C	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
	D	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro	act but some erroneous use of data and re limited command of knowledge and skills coherent and logical thinking, but with lim blems. Apply limited or barely effective or	sults to draw appropriate conclusions. s required for attaining some of the co- lited analytical and critical abilities. Shi rganizational and presentational skills	y effective lab skills an ourse learning outcomes ow limited ability to appl			
	D Fail	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization	ect but some erroneous use of data and re limited command of knowledge and skills coherent and logical thinking, but with lim	sults to draw appropriate conclusions. s required for attaining some of the co- lited analytical and critical abilities. Sh rganizational and presentational skills draw appropriate conclusions. skills required for attaining the course . Show very little or no ability to ap- ective or ineffective. Apply minimally e	y effective lab skills an ourse learning outcomes ow limited ability to appl Apply partially effectiv learning outcomes. Lac ply knowledge to solve			
• •	Fail Lecture	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M with laboratory compo	ect but some erroneous use of data and re limited command of knowledge and skills e coherent and logical thinking, but with lim blems. Apply limited or barely effective or s. Limited ability to use data and results to evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff lisuse of data and results and/or unable to	sults to draw appropriate conclusions. s required for attaining some of the co- lited analytical and critical abilities. Sh rganizational and presentational skills draw appropriate conclusions. skills required for attaining the course . Show very little or no ability to ap- ective or ineffective. Apply minimally e	y effective lab skills an ourse learning outcomes ow limited ability to appl . Apply partially effectiv learning outcomes. Lac ply knowledge to solve effective or ineffective la			
Course Teaching	Fail	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M with laboratory compo	ect but some erroneous use of data and re limited command of knowledge and skills e coherent and logical thinking, but with lim blems. Apply limited or barely effective or s. Limited ability to use data and results to evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff lisuse of data and results and/or unable to	sults to draw appropriate conclusions. s required for attaining some of the co- lited analytical and critical abilities. Sh rganizational and presentational skills draw appropriate conclusions. skills required for attaining the course . Show very little or no ability to ap- ective or ineffective. Apply minimally e	y effective lab skills an ourse learning outcomes ow limited ability to appl Apply partially effectiv learning outcomes. Lac ply knowledge to solve			
Course Teaching	Fail Lecture	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M with laboratory compones	ect but some erroneous use of data and re limited command of knowledge and skills e coherent and logical thinking, but with lim blems. Apply limited or barely effective or s. Limited ability to use data and results to evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff lisuse of data and results and/or unable to nent course	sults to draw appropriate conclusions. s required for attaining some of the co- lited analytical and critical abilities. Sh rganizational and presentational skills draw appropriate conclusions. skills required for attaining the course . Show very little or no ability to ap- ective or ineffective. Apply minimally e	y effective lab skills an ourse learning outcomes ow limited ability to appl. Apply partially effectiv learning outcomes. Lac ply knowledge to solveffective or ineffective la			
Course Teaching	Fail Lecture	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M with laboratory composes	ect but some erroneous use of data and re limited command of knowledge and skills e coherent and logical thinking, but with lim blems. Apply limited or barely effective or s. Limited ability to use data and results to evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff lisuse of data and results and/or unable to nent course	sults to draw appropriate conclusions. s required for attaining some of the co- lited analytical and critical abilities. Sh rganizational and presentational skills draw appropriate conclusions. skills required for attaining the course . Show very little or no ability to ap- ective or ineffective. Apply minimally e	y effective lab skills an ourse learning outcomes ow limited ability to appl Apply partially effectiv learning outcomes. Lac ply knowledge to solve effective or ineffective la  No. of Hours 36 6			
Course Teaching	Fail Lecture	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M with laboratory compo	ect but some erroneous use of data and re limited command of knowledge and skills e coherent and logical thinking, but with lim blems. Apply limited or barely effective or s. Limited ability to use data and results to evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff lisuse of data and results and/or unable to nent course	sults to draw appropriate conclusions. s required for attaining some of the co- lited analytical and critical abilities. Sh rganizational and presentational skills draw appropriate conclusions. skills required for attaining the course . Show very little or no ability to ap- ective or ineffective. Apply minimally e	y effective lab skills an ourse learning outcomes ow limited ability to appl. Apply partially effectiv learning outcomes. Lac ply knowledge to solveffective or ineffective la			
Course Teaching	Fail  Lecture  Activitic  Lectures  Laborat  Tutorials	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M with laboratory compo	ect but some erroneous use of data and re limited command of knowledge and skills e coherent and logical thinking, but with lim blems. Apply limited or barely effective or s. Limited ability to use data and results to evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff lisuse of data and results and/or unable to nent course	sults to draw appropriate conclusions. s required for attaining some of the co- lited analytical and critical abilities. Sh rganizational and presentational skills draw appropriate conclusions. skills required for attaining the course . Show very little or no ability to ap- ective or ineffective. Apply minimally e	y effective lab skills an ourse learning outcomes ow limited ability to app. Apply partially effectiv learning outcomes. Lac ply knowledge to solve effective or ineffective la  No. of Hours 36 6			
Course Teaching & Learning Activities Assessment Methods	Fail  Lecture  Activitic  Lectures  Laborat  Tutorials	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M with laboratory compo	ect but some erroneous use of data and re limited command of knowledge and skills e coherent and logical thinking, but with lim blems. Apply limited or barely effective or s. Limited ability to use data and results to evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally eff lisuse of data and results and/or unable to nent course	sults to draw appropriate conclusions. s required for attaining some of the co- lited analytical and critical abilities. Sh rganizational and presentational skills draw appropriate conclusions. skills required for attaining the course . Show very little or no ability to ap- ective or ineffective. Apply minimally e	y effective lab skills an ourse learning outcomes ow limited ability to appl. Apply partially effectiv learning outcomes. Lac ply knowledge to solve effective or ineffective la  No. of Hours  36 6 8 80  Assessment Methods			
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail  Lecture Activitic Lectures Laborate Tutorials Reading	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M with laboratory compones s ory s y / Self study s	ect but some erroneous use of data and re limited command of knowledge and skills coherent and logical thinking, but with limblems. Apply limited or barely effective or s. Limited ability to use data and results to evidence of command of knowledge and all abilities, logical and coherent thinking and presentational skills are minimally efficience of data and results and/or unable to nent course  Details	sults to draw appropriate conclusions. s required for attaining some of the contied analytical and critical abilities. Shrganizational and presentational skills draw appropriate conclusions. skills required for attaining the course. Show very little or no ability to agective or ineffective. Apply minimally edraw appropriate conclusions.	y effective lab skills an ourse learning outcomes ow limited ability to appl. Apply partially effectiv learning outcomes. Lac ply knowledge to solve effective or ineffective la  No. of Hours  36 6 8 80  Assessment			
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture Activiti Lecture Laborat Tutorials Reading Method	techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and technique: Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M with laboratory compones s ory s y / Self study s nents	ect but some erroneous use of data and re limited command of knowledge and skills coherent and logical thinking, but with limblems. Apply limited or barely effective or s. Limited ability to use data and results to evidence of command of knowledge and all abilities, logical and coherent thinking and presentational skills are minimally efficience of data and results and/or unable to nent course  Details	sults to draw appropriate conclusions. s required for attaining some of the contied analytical and critical abilities. Shrganizational and presentational skills draw appropriate conclusions. skills required for attaining the course. Show very little or no ability to apective or ineffective. Apply minimally of draw appropriate conclusions.  Weighting in final course grade (%)	y effective lab skills an ourse learning outcomes ow limited ability to appl. Apply partially effectiv learning outcomes. Lac ply knowledge to solve effective or ineffective la  No. of Hours  36 6 8 80  Assessment Methods to CLO Mapping			

	Test		15	CLO 1,2,3
Required/recommended reading and online materials	C. Kittel: Introduction to Solid State	Physics (John Wiley, 1986, 6th ed.)		

PHYS3650	Observ	ational astronomy	(6 credits)	Academic Yea	r 2017			
Offering Department	Physics	Quota						
Course Co-ordinator	DrJJLL	·						
Teachers Involved	(Dr J J L	(Dr J J L Lim,Physics)						
Course Objectives		An introduction to tools of contemporary observation astronomy, with a focus on those used at optical wavelengths,						
·		n a hands-on approa		nd galaxies at optical wavelengthence in doing astronomical obse				
Course Contents & Topics	observati astronom	ions; properties of ast nical spectroscopy; ob	ronomical detectors (PMT, CC	scopes; properties of light, atmo CD); astronomical imaging and n ies including blackbody radiation edshifts.	nagnitude system			
Course Learning	On succe	essful completion of this	s course, students should be at	ole to:				
Outcomes	CLO 1 d		· · · · · · · · · · · · · · · · · · ·	elescopes and modern astronor	nical detectors at			
	CLO 2 d	escribe the effects of t	he properties of light and Earth'	s atmosphere on astronomical ob	servations			
	CLO 3 e	xplain how the method tars, galaxies, and the	ds of astronomical photometry a universe	and spectroscopy are applied to the				
			telescope to conduct simple day	y and night sky observations				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	Pass in PHYS1650 and (PHYS2250 or PHYS2265)						
Offer in 2017 - 2018	Y 1s	t sem Offer in 2018 -	2019 : Y	Examination	Dec			
Grade Descriptors	Α	Demonstrate thorough n	nastery at an advanced level of exter	sive knowledge and skills required for a	ttaining all the course			
(A+ to F)	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course							
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.							
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
	D	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.						
	Fail	of analytical and critical problems. Organization a	abilities, logical and coherent thinking	d skills required for attaining the course le ng. Show very little or no ability to appl effective or ineffective. Apply minimally eff to draw appropriate conclusions.	y knowledge to solve			
Course Type	Lecture v	vith laboratory compon	ent course					
Course Teaching	Activitie	s	Details		No. of Hours			
& Learning Activities	Lectures				36			
	Laborato	ory			4			
	Tutorials	;			8			
	Reading	/ Self study			80			
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm			30	CLO 1,2,3			
	Examination		2-hour written exam	50	CLO 1,2,3			
	Laborato	ory reports		10	CLO 4			
	Test			10	CLO 1,2,3			
Required/recommended reading and online materials	Frederick		sure the Sky	nysics (Addison-Wesley Publishing	g Company, 2007			

PHYS3651	The phy	sical universe (6 credits)		Academic Year	2017			
Offering Department	Physics			Quota				
Course Co-ordinator	Dr S C Y	g, Physics (ncy@bohr.physics.hkt	ı.hk)					
Teachers Involved	(Dr S C Y	Ng,Physics)						
Course Objectives	To introd	To introduce basic physical principles of astronomy and build a foundation in modern astrophysics.						
Course Contents & Topics		Topics include: the sky and celestial coordinates, spherical geometry, optics and telescopes, basic celestial mechanics, two-body problem, radiative transfer, and blackbody radiation.						
Course Learning	On succe	On successful completion of this course, students should be able to:						
Outcomes	CLO 1	CLO 1 calculate the transformation between different celestial coordinate systems						
	CLO 2	CLO 2 describe the formation of spectral lines and basic structures of telescopes						
	CLO 3	CLO 3 derive the orbits in two body problem from first principle						
	CLO 4 recall the radiative transfer equation							
Pre-requisites (and Co-requisites	Pass in F	YS1650 and (PHYS2250 or PHYS	S2265)					

and Impermissible combinations)								
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 -	2019 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	Α	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D	Show evidence of some of	coherent and logical thinking, but with	cills required for attaining some of the co limited analytical and critical abilities. Shorganizational and presentational skills.	ourse learning outcomes. ow limited ability to apply			
	Fail	of analytical and critical		nd skills required for attaining the course ng. Show very little or no ability to ap effective or ineffective.				
Course Type	Lecture-b	ased course						
Course Teaching	Activitie	S	Details		No. of Hours			
& Learning Activities	Lectures				36			
	Tutorials				12			
	Reading / Self study				80			
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents		12	CLO 1,2,3,4			
	Examina	tion	2-hour written exam	60	CLO 1,2,3,4			
	Presentation			13	CLO 2,4			
	Test			15	CLO 1,2,3,4			
Required/recommended reading and online materials	Bradley V George B Frank H.: A. C. Phil	Lecture notes provided by Course Coordinator Bradley W. Carroll and Dale A. Ostlie, An Introduction to Modern Astrophysics, 2nd ed. (Pearson, 2007) George B. Rybicki and Alan P. Lightman, Radiative Processes in Astrophysics (Wiley-Interscience, 1985) Frank H. Shu, The Physical Universe: An Introduction to Astronomy (University Science Books, 1982) A. C. Phillips, The Physics of Stars (John Wiley & Sons, 1999) F. Mandl, Statistical Physics, 2nd ed. (John Wiley & Sons, 1988)						
Course Website		v.physics.hku.hk/~phys		,				

FILLCIPIE	es of astronion	ny (6 credits)		Academic Year	2017	
Physics				Quota		
Dr J J L Li	im, Physics (jjlim(	@hku.hk)				
(Dr J J L L	im,Physics)					
			nciples, and explain ho	w these principle	es are applied ir	
Topics ind telescopes	clude: special res s and interferome	elativity, Doppler effect; inte eters; binary stars and stellar p	eraction of light and morarameters, exoplanets;	natter, spectral li classification of s	ines; single-dish tellar spectra.	
On succes	ssful completion of	of this course, students should	d be able to:			
CLO 1 de	escribe and expla	in the physical principles disc	ussed			
CLO 2 as	sociate the corre	ect physical principles with the	observed properties of	certain astronomic	cal objects	
			nciple discussed to ex	plain or comput	e the observed	
Pass in Ph	Pass in PHYS1650 and (PHYS2250 or PHYS2265)					
Y 2nd	sem Offer in 2	2018 - 2019 : Y		Examination	May	
A Demonstrate thorough mastery of the knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities, clear logical thinking, evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar, and unfamiliar situations using highly effective organizational and presentation skills.						
B Demonstrate substantial command of the knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities, reasoned logical thinking, and ability to apply knowledge to familiar						
С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities, logical thinking, and ability to apply knowledge to most familia situations. Apply moderately effective organizational and presentational skills.					
D						
Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Lecture-ba	ased course					
Activities	5	Details	Details		No. of Hours	
Lectures					36	
Tutorials					12	
Reading /	Self study				80	
Methods		Details		e grade (%)	Assessment Methods to CLO Mapping	
Assignme	ents			35	CLO 1,2,3	
Examinati	ion	2-hour written exam		50	CLO 1,2,3	
Test				15	CLO 2,3	
	Dr J J L Li (Dr J J L Li (Dr J J L Li To introdu astronomy Topics in telescopes CLO 1 de CLO 2 as CLO 3 ap pr Pass in Pl  Y 2nd A  B  C  D  Fail  Lecture-ba Activities Lectures Tutorials Reading / Methods	Dr J J L Lim, Physics ( <i>ijjimi</i> (Dr J J L Lim, Physics) To introduce or review a astronomy to gain knowled Topics include: special relescopes and interferome On successful completion of CLO 1 describe and explain CLO 2 associate the correct of th	Dr J J L Lim, Physics (jjlim@hku.hk)  (Dr J J L Lim,Physics)  To introduce or review a number of basic physical pri astronomy to gain knowledge of the Universe.  Topics include: special relativity, Doppler effect; inte telescopes and interferometers; binary stars and stellar pronting on successful completion of this course, students should CLO 1 describe and explain the physical principles discipated in the physical principles with the CLO 3 associate the correct physical principles with the CLO 3 apply their understanding of the physical principles of select astronomical objects  Pass in PHYS1650 and (PHYS2250 or PHYS2265)  Y 2nd sem Offer in 2018 - 2019: Y  A Demonstrate thorough mastery of the knowledge and some unfamiliar, and unfamiliar situations using high the physical and critical abilities, clear logical thinking, evice of complex familiar situations. Apply effective organizational and some unfamiliar situations. Apply effective organizational and unfamiliar situations. Apply effective organizational and personal problems. Show evidence of some analytical and critical situations. Apply moderately effective organizational and personal problems. Apply imited or barely effective organizational and channel problems. Organization and presentational skills are minus problems. Organization and presentational skills are minus problems. Organization and presentational skills are minus problems. Petalls  Lecture-based course  Activities Details  Lectures  Tutorials  Reading / Self study  Methods  Details	Dr J J L Lim, Physics (jilim@hku.hk)  (Dr J J L Lim,Physics) To introduce or review a number of basic physical principles, and explain ho astronomy to gain knowledge of the Universe.  Topics include: special relativity, Doppler effect; interaction of light and melescopes and interferometers; binary stars and stellar parameters, exoplanets; On successful completion of this course, students should be able to:  CLO 1 describe and explain the physical principles discussed  CLO 2 associate the correct physical principles with the observed properties of CLO 3 apply their understanding of the physical principle discussed to exproperties of select astronomical objects  Pass in PHYS1650 and (PHYS2250 or PHYS2265)  Y 2nd sem Offer in 2018 - 2019: Y  A Demonstrate thorough mastery of the knowledge and skills required for attaining all the analytical and critical abilities, clear logical thinking, evidence of original thought, and of complex, familiar, and unfamiliar situations using highly effective organizational and Demonstrate substantial command of the knowledge and skills required for attain outcomes. Show evidence of analytical and critical abilities, reasoned logical thinking and some unfamiliar situations. Apply effective organizational and presentational skills  C Demonstrate general but incomplete command of knowledge and skills required for attain situations. Apply moderately effective organizational and presentational skills.  D Demonstrate partial but limited command of knowledge and skills required for attain Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities, logical and critical abilities (abilities), logical and critical ab	Dr J J L Lim, Physics (ijilim@hku.hk) (Dr J J L Lim,Physics) To introduce or review a number of basic physical principles, and explain how these principle astronomy to gain knowledge of the Universe.  Topics include: special relativity, Doppler effect; interaction of light and matter, spectral littelescopes and interferometers; binary stars and stellar parameters, exoplanets; classification of s On successful completion of this course, students should be able to:  CLO 1 describe and explain the physical principles discussed  CLO 2 associate the correct physical principles with the observed properties of certain astronomic  CLO 3 apply their understanding of the physical principle discussed to explain or compute properties of select astronomical objects  Pass in PHYS1650 and (PHYS2250 or PHYS2265)  Y 2nd sem Offer in 2018 - 2019 : Y Examination  Demonstrate substantial command of the knowledge and skills required for attaining at least most of outcomes. Show evidence of analytical and critical abilities, reasoned logical thinking, and ability to apply and some unfamiliar situations. Apply effective organizational and presentation skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of outcomes. Show evidence of some analytical and critical abilities, logical thinking, and ability to apply knowl situations. Apply effective organizational and presentational skills.  C Demonstrate general but limited command of knowledge and skills required for attaining most of outcomes. Show evidence of some analytical and critical abilities, logical thinking, and ability to apply knowl situations. Apply effective organizational and presentational skills.  D Demonstrate partial but limited command of knowledge and skills required for attaining most of outcomes. Show evidence of some coherent and logical thinking, but with limited or attaining some of the cours show evidence of some coherent and logical thinking, but with limited or attaining some of the cours have been applyed	

online materials 2nd edition)

PHYS3750	Laser ar	nd spectroscopy	(6 credits)		Academic Yea	r 2017			
Offering Department	Physics				Quota				
Course Co-ordinator	Prof S J X	u, Physics (sjxu@hl	ru.hk)						
Teachers Involved	(Prof S J )	(u,Physics)							
Course Objectives	The cours	e aims at providing a	a broad introduction to major	types of lasers and n	nodern laser spe	ctroscopy.			
Course Contents			odern laser spectroscopy. F		•				
& Topics		techniques. Lasers as spectroscopic light sources. Components of spectroscopic instruments. Photoluminesc							
		Raman spectra.							
Course Learning			nis course, students should b						
Outcomes			of fundamental optical proces						
			operation principle of moderr						
			wledge of modern laser spec						
			nts of modern optical spectro						
		nploy laser photolur Imples	ninescence setup to measur	e low-temperature p	hotoluminescend	ce spectra of solid			
	CLO 6 inf	erpret the experime	ntal data and compare with th	ne prediction of under	rlying physical pr	inciple			
Pre-requisites	Pass in Pl	HYS3551, or already	enrolled in this course.						
(and Co-requisites		Ź							
and Impermissible									
combinations)		055 1 004	2010 11						
Offer in 2017 - 2018		sem Offer in 2018			Examination	May			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cours learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilit to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational an presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate an insightful conclusions.							
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cour learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and technique							
	С	Correct use of data of results to draw appropriate conclusions.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning							
		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.							
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.							
	Fail	of analytical and critic problems. Organization	evidence of command of knowledg al abilities, logical and coherent the and presentational skills are minim disuse of data and results and/or una	ninking. Show very little of ally effective or ineffective	or no ability to apple. Apply minimally eff	ly knowledge to solve			
Course Type	Lecture w	th laboratory compo	nent course						
Course Teaching	Activities		Details			No. of Hours 36			
& Learning Activities	Lectures								
	Laborator	У				10			
	Tutorials					8			
	Reading / Self study					80			
Assessment Methods and Weighting	Methods		Details		iting in final e grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents			20	CLO 1,2,3,4,6			
	Examinat	ion	2-hour written exam		60	CLO 1,2,3,4			
	Laborator	y reports			20	CLO 5,6			
Required/recommended reading and online materials	Lecture N J. Garcia	otes prepared by Co	urse Coordinator nd D. Jaque: An Introduction	n to the Optical Spec	troscopy of Inorg				

PHYS3751	Physics of nanomaterials (6 credits)  Academic Year						
Offering Department	Physics		Quota				
Course Co-ordinator	TBC, Physics ()						
Teachers Involved	(TBC,Physics)						
Course Objectives	This course is designed to let senior undergraduate students and fresh postgraduate students know fundamental concepts and physical properties of nanomaterials including two-dimensional quantum wells, one-dimensional quantum wires and zero-dimensional quantum dots.						
Course Contents & Topics	Introduction to nanomaterials and quantum size effect. Dimensionalities and density of states of various nanomaterials. Optical and transport properties of quantum wells, superlattices and two-dimensional electron gas. Physical properties of carbon nanotubes and semiconductor nanowires. Physical properties of quantum dots and nanocrystals. Fundamental principles of scanning tunneling microscopy and advanced thin-film growth techniques such as molecular beam epitaxy and metalorganic chemical vapor deposition.						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 recall basic concepts and knowledge of dimensionality, density of states, quantum size effect  CLO 2 identify and compare optical and transport properties of quantum wells, superlattices and two-dimensi electron gas  CLO 3 recognise the fundamental principles of scanning tunneling microscopy and advanced thin-film ground techniques such as molecular beam epitaxy and metalorganic chemical vapor deposition  CLO 4 describe the basic physics of carbon nanotubes and semiconductor nanowires						
Pre-requisites (and Co-requisites	CLO 5 explain physical properties of zero-dimensional quantum dots and nanocrystals  Pass in PHYS3351; and  Pass in PHYS3551, or already enrolled in this course.						

and Impermissible combinations)							
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N		Examination			
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	tery at an advanced level of extensive rong analytical and critical abilities and de range of complex, familiar and un	logical thinking, with evidence of ori	ginal thought, and ability		
	В	B Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, reasoned logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations using effective organizational and presentation skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective observation skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems using limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	sed course					
Course Teaching & Learning Activities	Activities		Details		No. of Hours		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
Required/recommended reading and online materials	TBC						

PHYS3850	Waves a	nd optics (6 cre	edits)	Academic Ye	ar 2017		
Offering Department	Physics						
Course Co-ordinator	Prof S J X	u, Physics (sjxu@l	hku.hk)				
Teachers Involved		(u,Physics)	,				
Course Objectives		· · ·	on to the development of moder	n physical optics, with particular a	ttention to the way		
-	properties	of light and optic a	pplication.				
Course Contents	Mathemat	ical theory of wave	motion and the electromagnetic	c theory of light; the propagation	of light and the law		
& Topics				sis of waves; theories, experimer	ital observation an		
	application	ns of polarization, i	nterference and diffraction, thick	lenses.			
Course Learning			this course, students should be a				
Outcomes				iding propagation, reflection, refra	action, polarization		
			action by using the theory of wav				
			optics to calculate the geometr	rical parameters of thick lenses	and design optica		
		vices					
			ies to design anti-reflection and r	reflection-enhancement films			
Pre-requisites	Pass in Ph	HYS2255 and PHY	S2260				
and Co-requisites							
and Impermissible							
combinations)	V 4-4	Off:- 004	0. 0040 - 1/	Francis etter	D		
Offer in 2017 - 2018		sem Offer in 201		Examination	Dec		
Grade Descriptors	Α			ensive knowledge and skills required for s and logical thinking, with evidence of ori			
(A+ to F)		learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilities and logical thinking, with evidence of original thought, and abilities and unfamiliar situations. Apply highly effective organizational a					
	presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate an						
	insightful conclusions.  B Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes.						
	Show evidence of analytical and critical abilities, reasoned logical thinking, and ability to apply knowledge to familiar and some						
	unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct						
		use of data of results to draw appropriate conclusions.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning					
	С	outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to mos					
		familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective observation					
		skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply					
	knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective						
	lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.						
	Fail						
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab						
			Misuse of data and results and/or unable				
Course Type	Lecture wi	th laboratory comp	onent course				
Course Teaching	Activities	<b>i</b>	Details		No. of Hours		
& Learning Activities	Lectures						
	Laborator	у					
	Tutorials				8		
	Reading /	Self study			80		
Assessment Methods	Methods		Details	Weighting in final	Assessment		
and Weighting				course grade (%)	Methods		
-					to CLO Mappin		
	Assignme	ents		15	CLO 1,2,3		
	Examinati	ion	2-hour written exam	60	CLO 1,2,3		
	Laborator	y reports		10	CLO 1		
	Test			15	CLO 1,2,3		
	Test	OLO 1,2,3					
Required/recommended		otes provided by Co	ourse Coordinator	1.0	GLO 1,2,3		
Required/recommended eading and	Lecture no		ourse Coordinator son-Wesley, 2001, 4th ed.).		GLO 1,2,3		

Course Website http://moodle.hku.hk

PHYS3851	Atomic	and nuclear physic	s (6 credits)	Academic	Year	2017		
Offering Department	Physics			Quota				
Course Co-ordinator	Dr J H C							
Teachers Involved	(Dr J H C	Dr J H C Lee, Physics)						
Course Objectives	nuclear a	strophysics and applic	ations of atomic and nu	of atomic physics and nuclear physiclear science. It aims to provide an elective course to better prepare	stude	ents a conceptua		
Course Contents & Topics	Particle 8	operties of Atoms and Nuclei, Nuclear Composition, Liquid Drop Model, Shell Model in Atoms and Nuclei, article & Gamma Decay, Nuclear Reactions, Radiation Detectors, Nuclear Astrophysics, Frontier research and pplications in atomic and nuclear science.						
Course Learning Outcomes			course, students should					
Jucomes			e basic features of atom					
				anics to atomic and nuclear system				
			•	of physical effects in atoms and nu	iciei			
		•	•	reactions in nucleosynthesis				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	'HYS2250, PHYS2255 a	and PHYS2265					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2	2019 : Y	Examination	n	Dec		
Grade Descriptors	Α	Demonstrate thorough ma	istery at an advanced level of	of extensive knowledge and skills required	for at	taining all the course		
(A+ to F)	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course							
		learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.							
Course Type	Lecture w	ith laboratory compone	nt course					
Course Teaching	Activitie	S	Details			No. of Hours		
& Learning Activities	Lectures					36		
	Laborato	ry				6		
	Tutorials					8		
	Assessment					80		
Assessment Methods and Weighting	Methods	•	Details	Weighting in fina course grade (%)		Assessment Methods to CLO Mapping		
	Assignm	ents		10		CLO 1,2,3,4		
	Examina			60		CLO 1,2,3,4		
	Laborato	ry reports		10		CLO 1		
	Test			20		CLO 1,2,3,4		
Required/recommended reading and online materials	W. Demtr	oder: Atoms, molecules	oordinator s and photons (Springer, sysics (John Wiley & Sor					

PHYS3999	Directed studies in physics (6 credits)	Academic Year	2017			
Offering Department	Physics	Quota				
Course Co-ordinator	Prof K S Cheng, Physics (hrspksc@hku.hk)					
Teachers Involved	(Various teachers in the department, Physics)					
Course Objectives	This capstone course is offered to students majoring in physics, math/physics or astronomy. It should be taken normally in their final year of study. It provides students with the opportunity to study a small problem by themselves, either theoretical, experimental or numerical, under the supervision of an academic staff using the subject materials the student has learn in all years of his/her major study. The available projects range from small scale research, critical literature review and comment, and to development of university-level physics or astronomy teaching tools.					
Course Contents & Topics	Students interested in taking this course should contact their prospective supcontents and the nature of their projects in the coming academic year. They m prospective supervisor and the course coordinator to take this course.  Students will receive training in research literature reading and reviewing, member. For theoretical project, students may need to fill in mathematical gaps and the critically analyze the research methods used in the field. For numeric computers to reproduce existing numerical or simulation results. For experimenters and the design of the experiment, carrying it out and analyze the sources	ust get the appro under the super of some sophistical projects, stude nental projects, s	val from both the vision of a staff cated derivations ents need to use			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 review the knowledge of a physics or astronomy problem in depth through	ugh literature revi	ew of books and			

Required/recommended	Oral pres		including supervisor's comments (10%)	30 70	CLO 1,3,4,5 CLO 1,2,3,4,5				
and weighting									
and Weighting									
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
		/ Self study			84				
& Learning Activities		with supervisor		36					
Course Teaching	Activitie		Details		No. of Hours				
Course Type	Project-ba	ased course							
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Show little or no evidence of logical and independent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective								
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Show limited evidence of logical and independent thinking. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.							
	С	Demonstrate general but incomplete grasp of the subject. Show some evidence of logical and independent thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.							
	В	information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.							
Grade Descriptors (A+ to F)	A	analysis/evaluation of inform data and results to draw ap Work of A+ should show cor	o of the subject. Show evidence of strong nation drawn from a full range of high of propriate and insightful conclusions. Ap nsiderable additional work beyond that is	quality sources and to quote/refe ply highly effective organizationa required in wider areas relevant t	rence aptly. Critical use of il and presentational skills. o the topic.				
Offer in 2017 - 2018	Y 1st		ner Offer in 2018 - 2019 : Y	Examinatio					
(and Co-requisites and Impermissible combinations)	This caps	Major, Mathematics/Physics Major or Astronomy Major curriculum.  This capstone course is for Astronomy, Mathematics/Physics, and Physics Majors students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.							
Pre-requisites		Pass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Ph							
			s) propose and execute physic es of errors of the experiment or						
	Ìn		utational projects) identify the nalytical or numerical means, and						
		•	ections between the physical prin	· · · · · · · · · · · · · · · · · · ·					
	CLO 2 criticize existing approaches for solving the selected physics or astronomy problem								
			n what they have learnt in their n						

PHYS4150	Comput	ational physics (6 credits) Acad	demic Year	2017				
Offering Department	Physics							
Course Co-ordinator	Prof J Wa	ng, Physics (jianwang@hku.hk)						
Teachers Involved	(Prof J Wa	ing,Physics)						
Course Objectives	problems approache computation	f the course is show how the power of computers enables to computational to be adopted, which is distinct from, and complimentary to, traditional tes. The material covered will be found useful in any project or problem solving and or data analysis element. The course is designed such that a significant stually programming specific physical problems rather than learning abstract	experimentang work that at the fraction of the	I and theoretical contains a strong the student's time				
Course Contents & Topics	and differ mechanics Schroding Poisson's	The course will cover the following problems: Introductory computational physics and computer algebra, integration and differentiation, interpolation and extrapolation, ordinary differential equation such as those of classical mechanics, partial differential equations (such as the Maxwell's equation, the diffusion equation, and the Schrodinger equation), matrix methods (such as systems of equations and eigenvalue problems applied to Poisson's equation and electronic structure calculations), Monte Carlo (Metropolis algorithm) and other simulation methods (such as molecular dynamics), and several physics projects.						
Course Learning	On succes	sful completion of this course, students should be able to:						
Outcomes	CLO 1 demonstrate knowledge in essential methods and techniques for numerical computation in physics							
	CLO 2 apply Monte Carlo method and other simulation methods to solve deterministic as well as probabilistic physical problems  CLO 3 employ appropriate numerical method to interpolate and extrapolate data collected from physics experiments							
	CLO 4 use appropriate numerical method to solve the differential equations governing the dynamics of physical systems							
Pre-requisites (and Co-requisites and Impermissible combinations)		ATH3301 or MATH3401 or MATH3403 or MATH3405 or PHYS3150); and y three of the following courses: PHYS3350, PHYS3351, PHYS3450, PHYS	S3550					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2019 : Y	mination	Dec				
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.							
	В	Demonstrate substantial command of a broad range of knowledge and skills required for a learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and and some unfamiliar situations. Apply effective organizational and presentational skills. Apply Correct use of data of results to draw appropriate conclusions.	ability to apply	knowledge to familiar				
	С	Demonstrate general but incomplete command of knowledge and skills required for atta outcomes. Show evidence of some analytical and critical abilities and logical thinking, and						

		familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	Show evidence of knowledge to solv	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcome. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to ap knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effect lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.				
	of analytical and problems. Organiz	or no evidence of command of knowledge and critical abilities, logical and coherent thinkin ration and presentational skills are minimally et les. Misuse of data and results and/or unable to	g. Show very little or no ability to ap ffective or ineffective. Apply minimally experiences.	ply knowledge to solve		
Course Type	Lecture with laboratory co	mponent course				
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures					
	Laboratory					
	Tutorials					
	Reading / Self study			80		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		20	CLO 1,2,3,4		
	Examination	2-hour written exam	40	CLO 1,3,4		
	Presentation		15	CLO 1		
	Project report		25	CLO 1,2,3,4		
Required/recommended reading and online materials	Samuel S.M. Wong: Comp	Course Coordinator outational Methods in Physics and En anishi: Computational physics (Pears				

PHYS4151	Data ar	nalysis and modelin	g in physics (6 credits)	Academic Ye	ear 2017		
Offering Department	Physics			Quota			
Course Co-ordinator	Prof H F	Prof H F Chau, Physics (hfchau@hku.hk)					
Teachers Involved	(Prof H F	(Prof H F Chau, Physics)					
Course Objectives	special e basic pri for stude	This course covers general modeling and data analysis techniques used in physics and related subjects with special emphasis on their uses in complex systems, nonlinear systems and adaptive systems. The focus is on the basic principles and concepts rather than the use of computer packages. This course provides a solid foundation for students who intended to do computational physics and complex systems research. It also prepares students to work in related industries.					
Course Contents & Topics	basic hy difference complex data and physical be drawi	Topics include basic data analysis techniques, linear and non-linear fittings, determining the goodness of the fit, basic hypothesis testing techniques, modeling physical and related systems via differential (ordinary and/or partial), difference equations as well as discrete models such as cellular automata, introduction to complex systems, complex adaptive systems and nonlinear dynamics, the use of computer package such as Matlab in modeling and data analysis. The emphasis is on the basic principles and concepts rather than a particular software package or physical model. Depending on the mutual interests of the coordinators and the students, illustrative examples will be drawn from conventional fields such as classical mechanics, electromagnetism and quantum mechanics as well as more recent fields like biophysics, econophysics and sociophysics.					
Course Learning	On succ	essful completion of this	course, students should be able	e to:			
Outcomes	CLO 1 c CLO 2 a CLO 3 a	On successful completion of this course, students should be able to:  CLO 1 describe and explain state-of-the-art modeling methods used in physics  CLO 2 apply basic modeling techniques, together with logical and mathematical reasoning, to situations of the physical world  CLO 3 analyse and solve problems with the aid of computer packages such as Matlab  CLO 4 critically interpret experimental data from physics experiments					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in ( Pass in a	(MATH3301 or MATH34 any one of the following	01 or MATH3403 or MATH3405 courses: PHYS3350, PHYS335	or PHYS3150); and 1, PHYS3450, PHYS3550			
Offer in 2017 - 2018	N O	ffer in 2018 - 2019 : N		Examination			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective computer modeling skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.						
	В	Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, reasoned logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations using effective organizational and presentation skills. Apply effective computer modeling skills and techniques. Correct use of data of results to draw appropriate conclusions.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective computer modeling skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective computer modeling skills and techniques. Limited ability to use data and results to draw appropriate conclusions.					
	Fail	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lact of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective computer modeling skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
Course Type	Lecture	with laboratory compone	nt course				
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Laborate	J			12		
	Tutorials				8		
	Reading	g / Self study			80		
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		

	Assignments		10	CLO 1,2,3,4
	Examination	2-hour written exam	50	CLO 1,2,4
	Presentation		20	CLO 1,4
	Project report		20	CLO 1,2,3,4
Required/recommended reading and online materials	Lecture notes provided by Course J. R. Taylor: An Introduction to Err B. Hahn and D. Valentine: Essenti L. Lam: Nonlinear Physics for Beg N. Boccara: Modeling Complex Sy AL. Barabasi and H. E. Stanley: I	or Analysis (Univ. Sci. Books, 2rd e al Matlab for Engineers and Scient inners (World Sci., 1998) østems (Springer, 2nd ed., 2012)	ists (Academic Press, 5th	ed., 2013)

PHYS4350	Advanced classical mechanics (6 credits)  Academi				Academic Year	2017		
Offering Department	Physics Quota				Quota			
Course Co-ordinator	Prof S Q	rof S Q Shen, Physics (sshen@hku.hk)						
Teachers Involved	(Prof S Q	Prof S Q Shen,Physics)						
Course Objectives	mathema	Build on the advanced undergraduate level course PHYS3350, this course further discusses concepts and nathematical techniques in classical mechanics through special topics and applications. It serves as an elective course to better prepare students for their postgraduate studies in physics or other related disciplines.						
Course Contents & Topics		opics include: Hamiltonian principles, Lagrangian formulation of dynamics, nonlinear problems, many-body ystems, variational principle, generalized coordinates, simple application of Lagrangian equation.						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 explain the difference between Newtonian mechanics and analytical mechanics  CLO 2 solve the mechanical problems using Lagrangian formalism  CLO 3 discuss the connection between classical mechanics and quantum mechanics from Hamiltonian for					Marian farmation		
			itween classical mechanic iple to real physical situation		nanics from Hamil	itonian formalism		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS3350						
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20			Examination	Dec		
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of the knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.							
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.							
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Course Type	Lecture-b	ased course						
Course Teaching	Activitie	S	Details			No. of Hours		
& Learning Activities	Lectures					36		
	Tutorials					12		
	Reading	/ Self study				80		
Assessment Methods and Weighting	Methods		Details		ting in final e grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents			20	CLO 1,2,3,4		
	Examina	tion	3-hour written exam		60	CLO 1,2,3,4		
	Test				20	CLO 1,2,3,4		
Required/recommended reading and online materials		otes provided by Course ein, C. Poole, and J. Saf	Coordinator ko, Classical Mechanics, (	Pearson Education	Inc, 2004)			
Course Website	http://mod	odle.hku.hk						

PHYS4351	Advanced quantum mechanics (6 credits)	Academic Year	2017					
Offering Department	Physics	Quota						
Course Co-ordinator	Prof W Yao, Physics (wangyao@hku.hk)							
Teachers Involved	(Prof W Yao, Physics)							
Course Objectives	mathematical techniques in quantum mechanics through special topics and ap	Build on the advanced undergraduate level course PHYS3351, this course further discusses concepts and mathematical techniques in quantum mechanics through special topics and applications. It serves as an elective course to better prepare students for their postgraduate studies in physics or other related disciplines.						
Course Contents & Topics	Identical particles. Pauli exclusion principle. Fermion and bosons. WKB apprincements and degenerate perturbation theory. Time dependent perturbation partial waves and Born approximation. Variational method.							
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 review the perturbation theory and some other approximation methods of CLO 2 apply physics principles to describe the physical properties of various quantum systems	antum systems						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in PHYS3351							

Offer in 2017 - 2018	Y 2r	nd sem Offer in 2018 - 2	2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	outcomes. Show evidence		and skills required for attaining most es and logical thinking, and ability to a presentational skills.		
	D	Show evidence of some col	herent and logical thinking, but with li	Is required for attaining some of the committed analytical and critical abilities. Shiganizational and presentational skills.		
	Fail	of analytical and critical a		I skills required for attaining the course g. Show very little or no ability to ap fective or ineffective.		
Course Type	Lecture-	based course				
Course Teaching	Activitie	es	Details	No. of Hours		
& Learning Activities	Lectures	3		36		
	Tutorials				12	
	Reading	/ Self study			80	
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents		20	CLO 1,2,3	
	Examina	ation	3-hour written exam	60	CLO 1,2,3	
	Test			20	CLO 1,2,3	
Required/recommended reading and online materials		cture notes provided by Course Coordinator  J. Griffiths: Introduction to Quantum Mechanics (Pearson Prentice Hall, 2004, 2nd edition).				
Course Website	http://ww	w.physics.hku.hk/~phys4	l351/			

PHYS4450	Advance	ed electromagno	etism (6 credits)	Academic Ye	<b>ar</b> 2017		
Offering Department	Physics Quota						
Course Co-ordinator	Prof X D C	Prof X D Cui, Physics (xdcui@hku.hk)					
Teachers Involved	(Prof X D Cui, Physics)						
Course Objectives	Build on the advanced undergraduate level course PHYS3450, this course further discusses concepts and						
•	mathemati	ical techniques in	electromagnetism through special	I topics and applications. It se	rves as an elective		
	course to l	course to better prepare students for their postgraduate studies in physics or other related disciplines.					
Course Contents	Topics inc	opics include Maxwell's Equations, Poynting theorem, wave equations, reflection and transmission of waves					
& Topics		ave guides, retarded potentials, gauge transformations, dipole radiation, special theory of relativity.					
Course Learning	On succes	sful completion of	this course, students should be ab	le to:	•		
Outcomes	CLO 1 re	eview and discuss t	he fundamental physics in classica	al electrodynamics			
	CLO 2 a	pply Maxwell's equ	ations to analyze complicated elec	trostatic and magnetic phenome	ena		
	CLO 3 e	valuate how specia	Il relativity is incorporated in the stu	udy of electromagnetism			
			problems in electromagnetism using		hniques		
Pre-requisites	Pass in Ph		,	3 -	1		
(and Co-requisites	1 400 1111	1100100					
and Impermissible							
combinations)							
Offer in 2017 - 2018	Y 1st	sem Offer in 201	8 - 2019 : Y	Examination	Dec		
Grade Descriptors	Α	Demonstrate thorough	h mastery at an advanced level of extens	sive knowledge and skills required for	attaining all the course		
(A+ to F)	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability						
,	to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and						
	presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course						
	6	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar					
		and some unfamiliar situations. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most						
		outcomes. Snow evidence or some analytical and critical abilities and logical trinking, and ability to apply knowledge to mos familiar situations. Apply moderately effective organizational and presentational skills.					
	D	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.					
		Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply					
	Eail	knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. La					
	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve						
	problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities		Details	Details			
& Learning Activities	Lectures						
	Tutorials						
	Reading /	Self study			80		
Assessment Methods	Methods	-	Details	Weighting in final	Assessment		
and Weighting				course grade (%)	Methods		
0 0				grame (/e/	to CLO Mapping		
	Assignme	ents		10	CLO 1,2,3,4		
	Examinati		3-hour written exam	60	CLO 1,2,3,4		
	Test	-		30	CLO 1,2,3,4		
			0		,		
Required/recommended	I acture no		Nirea ( Antainator				
Required/recommended reading and		otes provided by Co	burse Coordinator Electrodynamics, 3rd ed., (Prentic	e-Hall 1999)			

PHYS4550	Advanced statistical mechanics (6 credits)	Academic Year	2017
PH 1 54550	Advanced statistical mechanics (6 credits)	Academic rear	2017

Offering Department	Physics			Quota				
Course Co-ordinator	Dr Y J Tı	Dr Y J Tu, Physics (yanjuntu@hku.hk)						
Teachers Involved	(Dr Y J Tu,Physics)							
Course Objectives	Build on the advanced undergraduate level course PHYS3550, this course further discusses concepts and mathematical techniques in statistical mechanics through special topics and applications. It serves as an elective course to better prepare students for their postgraduate studies in physics or other related disciplines.							
Course Contents & Topics		course to better prepare students for their postgraduate studies in physics or other related disciplines.  Topics include: Statistical ensembles for isolated and open systems. Equilibrium fluctuations. Order and disorder phase transition. Mean field and Landau theory. Classical ideal gas, quantum ideal gas. Quantum fluid.						
Course Learning		On successful completion of this course, students should be able to:						
Outcomes			fundamental physical principle					
	CLO 2 a	apply these principles, too	1 7 1 1	natical reasoning, to situations of	of the physical world			
Pre-requisites (and Co-requisites and Impermissible combinations)		PHYS3550						
Offer in 2017 - 2018	Y 2n	nd sem Offer in 2018 - 2	2019 : Y	Examination	May			
Grade Descriptors (A+ to F)	Α	learning outcomes. Show s	strong analytical and critical abilities a	sive knowledge and skills required for and logical thinking, with evidence of or unfamiliar situations. Apply highly effe	iginal thought, and ability			
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.							
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Course Type	Lecture-l	based course						
Course Teaching	Activitie	es	Details		No. of Hours			
& Learning Activities	Lectures	3			36			
	Tutorials	3			12			
	Reading	/ Self study			80			
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm	nents		20	CLO 1,2,3			
	Examina		3-hour written exam	50	CLO 1,2,3			
	Test			30	CLO 1,2,3			
Required/recommended reading and online materials			e Coordinator Statistical Mechanics, 3rd edit	ion (Academic Press, 2011)	·			

PHYS4551	Solid St	ate physics (6 credit	s)	Academic Year	2017		
Offering Department	Physics	Physics Quota					
Course Co-ordinator	Prof J Wa	Prof J Wang, Physics (jianwang@hku.hk)					
Teachers Involved	(Prof J W	(Prof J Wang, Physics)					
Course Objectives		To provide a broad introduction to modern theory of the solid state physics. Some advanced topics will also be discussed.					
Course Contents & Topics	thermal p	Crystal structures and symmetry. The reciprocal lattice and X-ray diffraction in crystals. Lattice vibrations and thermal properties. Free electron of metals. Band structures and Bloch theory. Nearly free electrons and tight binding model. Band structure calculations for realistic systems. The semi-classical model of electron dynamics.					
Course Learning			ourse, students should be able to:				
Outcomes	CLO 1 d	lemonstrate knowledge fo	or crystal structures and characterization				
	CLO 2	lescribe the behavior of s	olid matter and explain the underlying phy	ysical concepts			
	CLO 3 a	apply physical principles a	and mathematical equations to discuss the	e physical properties of	f materials		
	CLO 4	liscuss various methods t	to calculate the band structures and the m	najor approximation inv	olved		
combinations)		0% : 0040	0.00 M				
and Impermissible combinations) Offer in 2017 - 2018		d sem Offer in 2018 - 2		Examination	May		
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Y 2nd	Demonstrate thorough mass learning outcomes. Show str	019 : Y tery at an advanced level of extensive knowledge rong analytical and critical abilities and logical think de range of complex, familiar and unfamiliar situe	and skills required for attaining, with evidence of original	aining all the course al thought, and ability		
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors		Demonstrate thorough mass learning outcomes. Show st to apply knowledge to a wi presentational skills. Demonstrate substantial cor learning outcomes. Show ev	tery at an advanced level of extensive knowledge rong analytical and critical abilities and logical think	and skills required for attaing, with evidence of originations. Apply highly effective equired for attaining at least hinking, and ability to apply	aining all the course all thought, and ability e organizational and at most of the course		
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	A	Demonstrate thorough mass learning outcomes. Show sto apply knowledge to a wip presentational skills.  Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation.  Demonstrate general but in outcomes. Show evidence of the standard standard some unfamiliar situation.	tery at an advanced level of extensive knowledge rong analytical and critical abilities and logical think de range of complex, familiar and unfamiliar situa mmand of a broad range of knowledge and skills r idence of analytical and critical abilities and logical t	and skills required for attaing, with evidence of originations. Apply highly effective equired for attaining at leas hinking, and ability to apply I skills.  Jired for attaining most of thinking, and ability to apply	aining all the course al thought, and ability e organizational and at most of the course knowledge to familiar the course learning		
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	В	Demonstrate thorough masi learning outcomes. Show st to apply knowledge to a wip presentational skills.  Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation Demonstrate general but ir outcomes. Show evidence of familiar situations. Apply more Demonstrate partial but limit Show evidence of some coh	tery at an advanced level of extensive knowledge rong analytical and critical abilities and logical think de range of complex, familiar and unfamiliar situe mmand of a broad range of knowledge and skills r idence of analytical and critical abilities and logical t ns. Apply effective organizational and presentationa complete command of knowledge and skills request of some analytical and critical abilities and logical to some analytical and critical abilities and logical to the strength of the stre	and skills required for attaing, with evidence of original titions. Apply highly effective equired for attaining at leas hinking, and ability to apply I skills.  Jired for attaining most of thinking, and ability to apply skills.  attaining some of the course and critical abilities. Show I	aining all the course al thought, and ability e organizational and st most of the course knowledge to familiar the course learning y knowledge to most e learning outcomes.		
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	B C	Demonstrate thorough masi learning outcomes. Show st to apply knowledge to a wi presentational skills.  Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation Demonstrate general but ir outcomes. Show evidence of familiar situations. Apply mon Demonstrate partial but limit Show evidence of some coh knowledge to solve problems Demonstrate little or no evid of analytical and critical abd	tery at an advanced level of extensive knowledge rong analytical and critical abilities and logical think de range of complex, familiar and unfamiliar situal mmand of a broad range of knowledge and skills in idence of analytical and critical abilities and logical the ss. Apply effective organizational and presentational icomplete command of knowledge and skills required for some analytical and critical abilities and logical the derately effective organizational and presentational ed command of knowledge and skills required for erent and logical thinking, but with limited analytical	and skills required for attaing, with evidence of original stions. Apply highly effective equired for attaining at leas hinking, and ability to apply I skills.  Jired for attaining most of thinking, and ability to apply skills.  attaining some of the cours and critical abilities. Show I depresentational skills.  for attaining the course lear little or no ability to apply	aining all the course al thought, and ability e organizational and st most of the course knowledge to familiar the course learning y knowledge to most e learning outcomes. limited ability to apply rming outcomes. Lack		
and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	B C D	Demonstrate thorough masi learning outcomes. Show st to apply knowledge to a wi presentational skills.  Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation Demonstrate general but ir outcomes. Show evidence of familiar situations. Apply mon Demonstrate partial but limit Show evidence of some coh knowledge to solve problems Demonstrate little or no evid of analytical and critical abd	tery at an advanced level of extensive knowledge rong analytical and critical abilities and logical think de range of complex, familiar and unfamiliar situe mmand of a broad range of knowledge and skills reidence of analytical and critical abilities and logical the sa. Apply effective organizational and presentational complete command of knowledge and skills required for some analytical and critical abilities and logical derately effective organizational and presentational ed command of knowledge and skills required for a command of knowledge and skills required illities, logical and coherent thinking. Show very ligical and coherent thinking. Show very ligital services are successed and skills required thinking. Show very ligital services are successed and skills required thinking.	and skills required for attaing, with evidence of original stions. Apply highly effective equired for attaining at leas hinking, and ability to apply I skills.  Jired for attaining most of thinking, and ability to apply skills.  attaining some of the cours and critical abilities. Show I depresentational skills.  for attaining the course lear little or no ability to apply	aining all the course al thought, and ability e organizational and st most of the course knowledge to familiar the course learning y knowledge to most e learning outcomes. limited ability to apply rming outcomes. Lack		

& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		20	CLO 1,2,3,4
	Examination	3-hour written exam	60	CLO 1,2,3,4
	Test		20	CLO 1,2,3,4
Required/recommended reading and online materials	C. Kittel: Introduction to solid state		nd Winston, 1987).	

PHYS4650	Stellar p	hysics (6 credits)		Academic Yea	r 2017		
Offering Department	Physics			Quota			
Course Co-ordinator	Dr S C Y N	Or S C Y Ng, Physics (ncy@bohr.physics.hku.hk)					
Teachers Involved	(Dr S C Y	(Dr.S.C.Y.Ng,Physics) To introduce the basic theory of stellar structure and evolution. It follows a vigorous mathematical treatment that					
Course Objectives	To introduce the basic theory of stellar structure and evolution. It follows a vigorous mathematical treatment that stresses on the underlying physical processes. Knowledge in quantum mechanics and statistical mechanics will be advantageous.						
Course Contents & Topics	stellar rad sequence explosion. and planet	Topics include: Definition of stars. The H-R diagram. Stellar structure equations. Polytropic model. Elementary stellar radiation processes. Simple stellar nuclear processes. Saha equation. Stability of stars. Zero-age main sequence stars and their evolution. The solar neutrino problem. Late stage evolution of stars. Supernova explosion. If time permits, special topics selected from below will be briefly mentioned: star formation, brown dwarfs and planets, AGB stars and planetary nebulae, binary stars and their evolution, Cepheid variables and theory of stellar pulsation, and introduction to helioseismology.					
Course Learning		On successful completion of this course, students should be able to:					
Outcomes			to classify different types of				
	CLO 2 an		solve problems related to th	e structure and evolution of stars in	ncluding the use of		
	of	stars		n stars and how these processes a	ffect the evolution		
	CLO 4 as	sess selected research	papers in the field of stellar	astrophysics			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ph	IYS3351 and PHYS365	51				
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar						
	С	outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most					
	familiar situations. Apply moderately effective organizational and presentational skills.  D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited or barely effective organizational and presentational skills.						
	Fail  Nowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ised course	,				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures		- Stario		36		
•	Tutorials				12		
		Self study			80		
Assessment Methods and Weighting	Methods	<b>,</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts		10	CLO 1,2,3,4		
	Examinati		2-hour written exam	60	CLO 1,2,3		
	Project rep			10	CLO 1,2,3,4		
	Test			20	CLO 1,2,3		
Required/recommended reading and online materials	Prialnik, D A. C. Philli Bowers, R	ps, The Physics of Stars . & Deeming, T.: Astrop	theory of stellar structure ar s (John Wiley & Sons, 1999 hysics I. Stars (Jones and E	Sartlett, 1984)			
Caa Wah-!-		,	to Stellar Astrophysics (Wile	ey, 2010)			
Course Website	nttp://www	.physics.hku.hk/~phys4	·65U/				

PHYS4651	Selected topics in astrophysics (6 credits)	Academic Year	2017
Offering Department	Physics	Quota	
Course Co-ordinator	Prof K S Cheng, Physics (hrspksc@hku.hk)		
Teachers Involved	(Prof K S Cheng, Physics)		
Course Objectives	To introduce students some current topics in astrophysics. It may be taken background to research work in astrophysics.	as a self-contain	ed course or as
Course Contents & Topics	Topics include: Brief review of thermodynamical equilibrium, radiation mechanis of shock wave. Properties of Cosmic rays. Physics of compact stellar objects in	· ·	, ,

	neutron s	•	tars. Elements of cosmology: cl	lassical and relativistic dynamical th	eories, observationa	
Course Learning	1		of this course, students should be	be able to:		
Outcomes				roperties of various astrophysical sy	stems	
	CLO 2 explain the observed phenomena of some selected astrophysical objects					
				ing physical concepts associated w	th the astronhysical	
			dynamic interactive processes	ing physical concepts associated w	ui uic astropitysica	
Pre-requisites (and Co-requisites and Impermissible combinations)			7S3450 or PHYS3550 or PHYS3	3651		
Offer in 2017 - 2018	Y 1st	sem Offer in 2	018 - 2019 : N	Examination	Dec	
Grade Descriptors (A+ to F)	A	learning outcomes	<ul> <li>Show strong analytical and critical abige to a wide range of complex, familia</li> </ul>	extensive knowledge and skills required fo ilities and logical thinking, with evidence of o r and unfamiliar situations. Apply highly eff	riginal thought, and ability	
	В	learning outcomes		mowledge and skills required for attaining at al abilities and logical thinking, and ability to a anal and presentational skills.		
	С					
	D					
	Fail	Demonstrate little of analytical and	or no evidence of command of knowled	ge and skills required for attaining the course thinking. Show very little or no ability to a		
Course Type	Lecture w	ith laboratory co	mponent course			
Course Teaching	Activities	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Laborato	ry			8	
	Tutorials	•			8	
	Reading	/ Self study			80	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		8	CLO 1,2,3	
	Examinat	tion		50	CLO 1,2,3	
	Laborato	ry reports		7	CLO 1,2,3	
	Presenta	tion		15	CLO 1,2,3	
	Test			20	CLO 1,2,3	
Required/recommended		. ,	Course Coordinator			
reading and online materials		roll & D. A. Ostli		arfs and Neutron Stars (John Wiley, trophysics (Addison-Wesley Publish		

PHYS4652	Planetary	y scienc	e (6 credits)	)			Academic Year	2017
Offering Department	Physics						Quota	
Course Co-ordinator	Dr M H Lee	e, Physics	(mhlee@hku.	hk)				
Teachers Involved	(Dr M H Le	e,Physics	)					
Course Objectives							the properties of geological proce	
Course Contents & Topics				moons and mir surfaces, and into			stem; planetary d asolar planets.	ynamics; energ
Course Learning	On succes	sful comp	etion of this co	ourse, students s	should be able	to:		
Outcomes	and	d experim	ents	,		, , ,	ems acquired thro	ugh observation
							planetary bodies	
			al principles t lanetary bodie		dels for some	basic aspects	s of the structure	e, formation and
and Impermissible combinations)			`	and PHYS3550)	)			
(and Co-requisites and Impermissible			r (PHYS3350 er in 2018 - 20	,	)		Examination	May
(and Co-requisites and Impermissible combinations)		sem Off	er in 2018 - 20 e thorough maste comes. Show str owledge to a wic	019 : N ery at an advanced ong analytical and ci	level of extensive	logical thinking, w	<b>Examination</b> skills required for att ith evidence of origin Apply highly effective	aining all the course al thought, and abilit
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd	sem Offi Demonstrat learning ou to apply kr presentatio Demonstrat learning ou	er in 2018 - 20 e thorough mast comes. Show str owledge to a wic all skills. e substantial com comes. Show evi	019 : N ery at an advanced ong analytical and ci de range of complex	level of extensivviritical abilities and to the familiar and un tinge of knowledge and critical abilities	logical thinking, w familiar situations. e and skills require and logical thinkin	skills required for att vith evidence of origin Apply highly effectived for attaining at leasing, and ability to apply	aining all the cours al thought, and abilit e organizational and at most of the cours
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd	sem Offi Demonstrai learning ou to apply kr presentatio Demonstrai learning ou and some u Demonstrai outcomes, familiar situ	er in 2018 - 20 e thorough mast comes. Show str owledge to a wic all skills. e substantial com comes. Show evi nfamiliar situation e general but in show evidence o ations. Apply mod	ong an advanced ong analytical and cide range of complex nmand of a broad radence of analytical as. Apply effective orgcomplete command if some analytical an lerately effective orgcorpte offective orgcomplete.	level of extensivy ritical abilities and continuation of knowledge and critical abilities ganizational and pof knowledge and critical abilities anizational and present a critical abilities anizational and present a critical abilities anizational and present abilities and continuational and present abilities and continuational and present abilities and continuational and critical abilities anizational and present and critical abilities anizational and present anizational aniza	logical thinking, w familiar situations. e and skills require and logical thinkin resentational skills d skills required t and logical thinkin esentational skills.	skills required for att vith evidence of origin. Apply highly effective and for attaining at least ag, and ability to apply for attaining most of ag, and ability to appl	aining all the cours al thought, and abilit e organizational an st most of the cours knowledge to familia the course learning y knowledge to mos
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd A B	sem Offi Demonstrat learning ou to apply kr Demonstrat learning ou and some t Demonstrat outcomes, familiar situ Demonstrat Show evide	er in 2018 - 20 e thorough mast comes. Show str owledge to a wic all skills. e substantial com comes. Show evi nfamiliar situation e general but in Show evidence o ations. Apply mod e partial but limite nce of some cohe	ery at an advanced ong analytical and cong analytical and congle of complex mand of a broad radence of analytical a is. Apply effective orgcomplete command if some analytical and learately effective orged command of know	level of extensivi ritical abilities and k, familiar and un ange of knowledge and critical abilities ganizational and pr of knowledge an d critical abilities anizational and pre wledge and skills king, but with limit	logical thinking, w familiar situations. and skills require and logical thinkin resentational skills id skills required and logical thinkin asentational skills. required for attaining ed analytical and c	skills required for att vith evidence of origin Apply highly effective and for attaining at least g, and ability to apply for attaining most of fig, and ability to apply ing some of the cours critical abilities. Show	aining all the cours al thought, and abilitive organizational and st most of the cours knowledge to familia the course learning y knowledge to most elearning outcomes
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd A B C	sem Offi Demonstral learning ou to apply kr presentatio Demonstral learning ou and some u Demonstral outcomes. familiar situ Demonstral Show evide knowledge Demonstral of analytica	er in 2018 - 20 e thorough mast comes. Show str owledge to a wice all skills. e substantial com comes. Show evin framiliar situation e general but in Show evidence o ations. Apply mod e partial but limit nce of some cohe o solve problems e little or no evide I and critical abi	ong analytical and code range of complex on an advanced ong analytical and code range of complex on an analytical and code code complex complete command of some analytical anderately effective orged command of knowerent and logical thin is. Apply limited or barence of command of ence o	level of extensiviritical abilities and k, familiar and un ange of knowledge and critical abilities ganizational and professional and side a	logical thinking, w familiar situations. e and skills require and logical thinkin resentational skills id skills required to and logical thinkin esentational skills. required for attaining ed analytical and contractional and pressibles skills required for att Show very little of	skills required for att vith evidence of origin Apply highly effective and for attaining at least g, and ability to apply for attaining most of fig, and ability to apply ing some of the cours critical abilities. Show	aining all the cours- al thought, and abilit- e organizational an- st most of the cours- knowledge to familia the course learning y knowledge to most e learning outcomes limited ability to app

Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		20	CLO 1,2,3
	Essay		15	CLO 1,2,3
	Examination	2-hour written exam	50	CLO 1,2,3
	Test		15	CLO 1,2,3
Required/recommended reading and online materials		urse Coordinator Planetary Sciences (Cambridge U d I. Gilmour: An Introduction to the		iversity Press, 2011,
Course Website	http://moodle.hku.hk			

PHYS4653	Cosmol	ogy (6 credits)		Academic Yea	ar 2017	
Offering Department	Physics			Quota		
Course Co-ordinator	Prof K S (	Cheng, Physics (hrspl	(sc@hku.hk)			
Teachers Involved			· ·			
Course Objectives	mathema	tical formulation used		oduction to cosmology, to familiarize and dynamics of the universe, and to pr ky formation.		
Course Contents & Topics	bang mo	dels. Thermodynamic	cs of the early universe	cosmological theories. The metric of the Primordial nucleosynthesis. The verstructure and galaxy formation.		
Course Learning	On succe	ssful completion of thi	s course, students should	be able to:		
Outcomes	CLO 1 ap	oply physics principles	to describe the observati	ional/experimental aspects of cosmolog	Jy	
	CLO 2 ex	xplain the observed ph	nenomena of cosmology			
				ying physical concepts associated wit teractive processes that take place in t		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS3651 or PHYS36	52			
Offer in 2017 - 2018	N Off	er in 2018 - 2019 : Y		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. Show	w strong analytical and critical a	of extensive knowledge and skills required for bilities and logical thinking, with evidence of originar and unfamiliar situations. Apply highly effective for the control of the control o	inal thought, and ability	
	В					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but Show evidence of some knowledge to solve problem.	limited command of knowledge coherent and logical thinking, but lems. Apply limited or barely effective.	and skills required for attaining some of the cout with limited analytical and critical abilities. Shoective organizational and presentational skills.	w limited ability to appl	
	Fail	of analytical and critical problems. Organization a	I abilities, logical and coherent and presentational skills are mini	edge and skills required for attaining the course I t thinking. Show very little or no ability to app imally effective or ineffective.		
Course Type		ith laboratory compon				
Course Teaching	Activities	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Laborato	ry			8	
	Tutorials				12	
	Reading	/ Self study			80	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		8	CLO 1,2,3	
	Examinat	tion		50	CLO 1,2,3	
	Laborato	ry reports		7	CLO 1,2,3	
	Presenta	tion		15	CLO 1,2,3	
	Test			20	CLO 1,2,3	
Required/recommended reading and online materials	M. Lachie M. Rowar	ze-Rey: Cosmology: / n-Robinson: Cosmolog	A First Course (Cambridge gy (Clarendon Press, Oxfo			
Cauraa Wahaita			uon & Cosmology - A Bas	ic Introduction (Oxford, 2005)		
Course Website	mup.//mod	odle.hku.hk				

PHYS4654	General relativity (6 credits)	Academic Year	2017
Offering Department	Physics	Quota	
Course Co-ordinator	Dr M Su, Physics (mengsu84@hku.hk)		
Teachers Involved	(Dr M Su,Physics)		
Course Objectives	To introduce students to the field of general relativity. To provide conceptual s for astrophysical and cosmological applications of the theory.	kills and analytica	I tools necessary
Course Contents	The Principle of equivalence. Inertial observers in a curved space-time. Vectors	and tensors. Para	allel transport and

& Topics			Riemann tensor. The matter tens holes. Gravitational waves detecte		field equations. The		
Course Learning			nis course, students should be able				
Outcomes	CLO 1 apply the mathematical and physical ideas of the theory of general relativity for the study of various systems in astrophysics and cosmology						
	CLO 2 explain the observational effects at the scale of the Solar System that cannot be described by Newtonian gravity from a general relativistic point of view						
		demonstrate knowledo general relativistic app	ge and discuss the dynamic interactions and discuss the dynamic interactions.	ctive physical processes in astr	rophysics by using a		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	PHYS2055 and PHYS	3350				
Offer in 2017 - 2018	Y 2n	nd sem Offer in 2018	3 - 2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	learning outcomes. She to apply knowledge to presentational skills.	mastery at an advanced level of extension strong analytical and critical abilities and wide range of complex, familiar and u	nd logical thinking, with evidence of or unfamiliar situations. Apply highly effe	iginal thought, and ability ective organizational and		
	В	learning outcomes. Sho	al command of a broad range of knowledg ow evidence of analytical and critical abilitie uations. Apply effective organizational and	es and logical thinking, and ability to ap			
	С						
	D						
	Fail	of analytical and critic	evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally effe	. Show very little or no ability to ap			
Course Type	Lecture-b	based course					
Course Teaching	Activitie	es	Details				
			Details		No. of Hours		
& Learning Activities	Lectures		Details		No. of Hours		
& Learning Activities		3	Details				
& Learning Activities	Lectures Tutorials	3	Details		36		
Assessment Methods	Lectures Tutorials	s s ı / Self study	Details	Weighting in final course grade (%)	36 12		
Assessment Methods	Lectures Tutorials Reading	s s / Self study s			36 12 80 Assessment Methods		
Assessment Methods	Lectures Tutorials Reading Methods	s s y / Self study s		course grade (%)	36 12 80 Assessment Methods to CLO Mapping		
Assessment Methods	Lectures Tutorials Reading Methods Assignm	s s y / Self study s	Details	course grade (%)	36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3		
& Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Lectures Tutorials Reading Methods  Assignm Examina Test Lecture r R. M. Wa T. A. Moo J. B. Hard	S S S S S S S S S S S S S S S S S S S	Details  2-hour written exam	20 60 20 34) ss, 2012) vity (Addison-Wesley 2003)	36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3		

PHYS4655	Interste	ellar medium (6 credi	ts)		Academic Year	2017
Offering Department	Physics		•		Quota	
Course Co-ordinator	Dr M H L	_ee, Physics (mhlee@hku	.hk)			
Teachers Involved		· · · · · · · · ·	·			
Course Objectives	absorptio	on and emission of contin	with an advanced-level und uum and line radiation from plications and implications.			
Course Contents & Topics			adiation; physical and radia cular clouds; HII regions, neb			um and heavier
Course Learning	On succe	essful completion of this c	course, students should be at	ole to:		
Outcomes	CLO 1 e	express what exists betwe	en stars in spiral and elliptica	al galaxies		
		apply physical principles ons	to describe excitation/ioniza	tion and de-excita	ation/recombinatio	on of atoms and
		recognize which process medium	or processes occur or don	ninate in which o	bject or phase o	f the interstellar
Pre-requisites (and Co-requisites and Impermissible combinations)		PHYS3651 or (PHYS3351	and PHY3550)			
Offer in 2017 - 2018	-	ffer in 2018 - 2019 : Y			Examination	
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	tery at an advanced level of exter rong analytical and critical abilities ide range of complex, familiar and	and logical thinking, w	ith evidence of origina	al thought, and ability
	В	learning outcomes. Show ev	mmand of a broad range of knowle ridence of analytical and critical abili ns. Apply effective organizational ar	ties and logical thinkin	g, and ability to apply	
	С	outcomes. Show evidence	ncomplete command of knowledge of some analytical and critical abilit derately effective organizational and	ies and logical thinkir		
	D	Show evidence of some con knowledge to solve problem	ted command of knowledge and sk nerent and logical thinking, but with I s. Apply limited or barely effective or	imited analytical and organizational and pres	critical abilities. Show I entational skills.	imited ability to apply
	Fail	of analytical and critical at	lence of command of knowledge an bilities, logical and coherent thinkir presentational skills are minimally e	ng. Show very little o		
Course Type	Lecture-k	based course	•			

Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		20	CLO 1,2,3
	Essay		15	CLO 1,2,3
	Examination	2-hour written exam	50	CLO 1,2,3
	Test		15	CLO 1,2,3
Required/recommended reading and online materials		irse Coordinator try of the Interstellar Medium (Univ	versity Sciences Book, 2007)	

PHYS4750	Experiment	tal physics (6 cre	dits)		Academic Year	2017
Offering Department	Physics		•		Quota	
Course Co-ordinator	TBC, Physics	0				
Teachers Involved	(TBC,Physics	)				
Course Objectives	TBC					
Course Contents & Topics	TBC					
Course Learning Outcomes	On successfu	I completion of this c	ourse, students should	be able to:		
Pre-requisites (and Co-requisites and Impermissible combinations)	TBC					
Offer in 2017 - 2018	N Offer in	2018 - 2019 : N			Examination	
Grade Descriptors (A+ to F)	A B C D					
Course Type	Lecture with la	aboratory component	t course			
Course Teaching & Learning Activities	Activities	, ,	Details			No. of Hours
Assessment Methods and Weighting	Methods		Details		ting in final e grade (%) t	Assessment Methods to CLO Mapping
Required/recommended reading and online materials	TBC			·	'	. •

PHYS4850	Particle	physics (6 credits)		Academic Year	2017
Offering Department	Physics	• • • • • •		Quota	
Course Co-ordinator	Dr Y J Tu	ı, Physics <i>(yanjuntu@hku</i>	ı.hk)		
Teachers Involved	(Dr Y J T	u,Physics)	•		
Course Objectives			etical and experimental aspects of postgraduate studies in physics		an elective cours
Course Contents & Topics			ticles, symmetry and conservat particle accelerator and detecto		
Course Learning	On succe	essful completion of this c	ourse, students should be able to	0:	
Outcomes	CLO 1 d	escribe and explain the fu	undamental physical principles fo	or the standard model of particl	e physics.
		pply these principles, to rocesses.	gether with logical and mather	matical reasoning, to analyze	particle physics
	CLO 3 ca	apture the frontier and pro	ogress of particle physics.		
Pre-requisites	Pass in P				
(and Co-requisites and Impermissible combinations)		d sem Offer in 2018 - 2:	019 : Y	Examination	Mav
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)		Demonstrate thorough mass learning outcomes. Show st	019 : Y tery at an advanced level of extensive rong analytical and critical abilities and I ide range of complex, familiar and unfa	knowledge and skills required for at ogical thinking, with evidence of origin	nal thought, and abilit
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2n	Demonstrate thorough mass learning outcomes. Show st to apply knowledge to a wi presentational skills. Demonstrate substantial cor learning outcomes. Show ev	tery at an advanced level of extensive rong analytical and critical abilities and I	knowledge and skills required for at ogical thinking, with evidence of originamiliar situations. Apply highly effection and skills required for attaining at least ological thinking, and ability to apply	taining all the course nal thought, and abilit we organizational and est most of the course
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd	Demonstrate thorough mass learning outcomes. Show sto apply knowledge to a wip presentational skills.  Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation.  Demonstrate general but in outcomes. Show evidence of the providence of the	tery at an advanced level of extensive rong analytical and critical abilities and I ide range of complex, familiar and unfa mmand of a broad range of knowledge idence of analytical and critical abilities a	knowledge and skills required for at ogical thinking, with evidence of original miliar situations. Apply highly effection and skills required for attaining at least of logical thinking, and ability to apply esentational skills.  I skills required for attaining most of including the skills of the	taining all the course nal thought, and abilitive organizational and est most of the course knowledge to familia f the course learning
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd	Demonstrate thorough mass learning outcomes. Show st to apply knowledge to a wip presentational skills.  Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation Demonstrate general but ir outcomes. Show evidence of familiar situations. Apply more Demonstrate partial but limit Show evidence of some coh	tery at an advanced level of extensive rong analytical and critical abilities and I ide range of complex, familiar and unfammand of a broad range of knowledge ridence of analytical and critical abilities ans. Apply effective organizational and precomplete command of knowledge and of some analytical and critical abilities a	knowledge and skills required for at ogical thinking, with evidence of origin amiliar situations. Apply highly effection and skills required for attaining at least of thinking, and ability to apply essentational skills.  I skills required for attaining most of und logical thinking, and ability to appsentational skills.  The skills required for attaining most of the court of analytical and critical abilities. Show an adjusted and critical abilities.	taining all the course nal thought, and abilitive organizational and sist most of the course knowledge to familia of the course learning ly knowledge to most
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd A B C	Demonstrate thorough mass learning outcomes. Show st to apply knowledge to a wi presentational skills.  Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mon Demonstrate partial but limit Show evidence of some coh knowledge to solve problems Demonstrate little or no evid of analytical and critical abd	tery at an advanced level of extensive rong analytical and critical abilities and I de range of complex, familiar and unfammand of a broad range of knowledge ridence of analytical and critical abilities ans. Apply effective organizational and prevacional process of some analytical and critical abilities and erately effective organizational and prevacional of knowledge and some analytical and critical abilities and erately effective organizational and prevacional command of knowledge and skills reterent and logical thinking, but with limite	knowledge and skills required for at ogical thinking, with evidence of origin amiliar situations. Apply highly effection and skills required for attaining at least leas	taining all the course nal thought, and abilit we organizational and st most of the course / knowledge to familia f the course learning ly knowledge to most se learning outcomes limited ability to appli
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd A B C D Fail	Demonstrate thorough mass learning outcomes. Show st to apply knowledge to a wi presentational skills.  Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mon Demonstrate partial but limit Show evidence of some coh knowledge to solve problems Demonstrate little or no evid of analytical and critical abd	tery at an advanced level of extensive rong analytical and critical abilities and I ide range of complex, familiar and unfammand of a broad range of knowledge idence of analytical and critical abilities a. S. Apply effective organizational and procomplete command of knowledge and of some analytical and critical abilities a derately effective organizational and prested command of knowledge and skills reterent and logical thinking, but with limite s. Apply limited or barely effective organilence of command of knowledge and skills retered to the command of knowledge and skillstes, logical and coherent thinking. S	knowledge and skills required for at ogical thinking, with evidence of origin amiliar situations. Apply highly effection and skills required for attaining at least leas	taining all the course nal thought, and abilit we organizational and st most of the course / knowledge to familia f the course learning ly knowledge to most se learning outcomes limited ability to appli

& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		20	CLO 1,2,3
	Examination		50	CLO 1,2,3
	Test		30	CLO 1,2,3
Required/recommended reading and online materials	F. Halzen and A.D. Martin: Quark	s and leptons: an introdu	ctory course in modern particle physi ambridge University Press, 2000, 4th	

PHYS4966	Physics	internship (6 credit	ts)	Academic Yea	r 2017			
Offering Department	Physics	•	•	Quota				
Course Co-ordinator	Dr J C S F	Pun, Physics <i>(jcspun@h</i>	ku.hk)					
Teachers Involved	(NIL,Phys	IL,Physics)						
Course Objectives	normally i gain work	his capstone course is offered to students majoring in physics, math/physics or astronomy. It should be taken ormally in the summer immediately before their final year of study. It provides students with the opportunity to ain working experience in the field of physics or astronomy through intern placement. Students are expected to se what they have learnt in their majors in this intern.						
Course Contents & Topics	governme be arrange	udents will work as an intern for at least 160 hours within the University or outside the University in a company, overnment department or NGO. The work nature must be related to physics or astronomy. The internship should a arranged by the Department or obtained by students themselves. In the latter case, it must be approved before a commencement of the internship.						
Course Learning	On succes	ssful completion of this of	course, students should be able to:					
Outcomes	CLO 1 ap	pply physics or astronon	ny knowledge students have learnt i	n their majors to real worki	ng environment			
			r design part of the project he/she is		rnship			
			l and inter-personal communication					
Pre-requisites (and Co-requisites and Impermissible combinations)	Major, Ma This capst	ass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Physics ajor, Mathematics/Physics Major or Astronomy Major curriculum. his capstone course is for Astronomy, Mathematics/Physics, and Physics Majors students only. he earliest that a student is allowed to take this capstone course is their year 3 study.						
Offer in 2017 - 2018	Y Sur	mmer Offer in 2018 - 2	2019 : Y	Examination	No Exam			
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass Fail	Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and cli the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a of "Distinction".  Yery limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or as by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral rep						
Course Type	Internship	evaluation by supervisor(s),	, 0.0.					
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Internship		it is expected that students are to work at least 160 hours (or the equivalent of 4 weeks full-time)		160			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Written report		written report, employer's feedback and oral presentation	100	CLO 1,2,3			
Required/recommended reading and online materials	To be prov	To be provided by individual project supervisor						
Additional Course Information	be record interested Enrolment	tisfactory completion of this course can be counted towards the Capstone requirement. Details of internship v recorded on the student's transcript. This course will be assessed on "Pass/Fail" basis. Students who a erested to enrol in this course should contact the Department to obtain the approval. rolment of this course is not conducted via the online course selection system and should be made through the evant Department/School office after approval has been obtained from the course coordinator.						

PHYS4999	Physics project (12 credits) Academ	ic Year	2017			
Offering Department	Physics Quota					
Course Co-ordinator	Prof J Wang, Physics (jianwang@hku.hk)					
Teachers Involved	(Various teachers in the department, Physics)					
Course Objectives	This capstone course is offered to students majoring in physics, math/physics or astronomy. It is designed for those who are interested in tackling a research project in physics and/or astronomy. It should be taken normally in their final year of study. It provides students with the opportunity to study a specific problem by themselves, either theoretical, experimental or numerical, under the supervision of an academic staff using the knowledge the student gained in all years of his/her major study. The available projects are close to postgraduate level research in physics and/or astronomy.					
Course Contents & Topics	Students interested in taking this course should contact their prospective supervisors contents and the nature of their projects in the coming academic year. They must get the prospective supervisor and the course coordinator to take this course.  For theoretical and numerical projects: Students will receive training in research literature.	e appro	oval from both the			
	and make investigation which is close to research work in nature, under the supervision student may need to perform some original calculations, to fill in mathematical gaps derivations, or a combination of both. For numerical projects, students also need to numerical or simulation results.	of so	me sophisticated			

	For experimental projects: Students will carry out experiments in research labs under the supervision of a staff member. The student will receive a comprehensive training in advanced experimental techniques, including preparation of samples, determination of physical properties, measurement of small signals obscured by noise,					
			perature techniques and so on.	9	,	
		nality in experimental de		ŭ		
Course Learning	On succe	essful completion of this	course, students should be able t	0:		
Outcomes		olan and execute a the astronomy	eoretical, numerical or experimer	ital research project on a	topic in physics or	
	CLO 2 re	eview the knowledge of	f a physics or astronomy problem on what they have learnt in their r	. 0	review of books and	
			hes for solving the selected physic	•		
	CLO 4 d	lescribe and explain cor	nnections between the physical pri	nciples and the study probl	em	
	n		of the problem and solve them in the results with predictions or exist in the results with predictions or exist in the results with predictions or exist in the results with the			
			nysics experiments or astronomical or observation in comparison with			
Pre-requisites	Pass in a	at least 24 credits of adv	anced level (3XXX level or above	disciplinary core/elective of	courses of the Physic	
and Co-requisites	Major, Ma	athematics/Physics Maj	or or Astronomy Major curriculum.			
and Impermissible	This caps	stone course is for Astro	onomy, Mathematics/Physics, and	Physics Majors students of	nly.	
combinations)	The earlie	est that a student is allo	wed to take this capstone course	is their year 3 study.		
Offer in 2017 - 2018	Y Ye	ear long Offer in 2018	- 2019 : Y	Examinatio	n No Exam	
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis/evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.					
	В	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Project-b	ased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Meeting	with supervisor			54	
	Reading	/ Self study			126	
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral pres	sentation	including supervisor's comments (10%)	30	CLO 2,4,5,6	
	Researc	h report	, ,	70	CLO 1,2,3,4,5,6	
	Research report 70 CLO 1,2,3,4,5,6 To be provided by individual project supervisor					

PHYS7350	Graduat	e classical mechanics (6 credits)	Academic Year	2017			
Offering Department	Physics		Quota				
Course Co-ordinator	TBC, Phys	sics ()					
Teachers Involved	(TBC,Phy	sics)					
Course Objectives	TBC						
Course Contents & Topics	TBC						
Course Learning Outcomes	On succes	On successful completion of this course, students should be able to:					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Pl	Pass in PHYS4350					
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N	Examination				
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowlearning outcomes. Show strong analytical and critical abilities and logit to apply knowledge to a wide range of complex, familiar and unfamil presentational skills.	cal thinking, with evidence of origina	al thought, and ability			
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no evidence of command of knowledge and skills r	required for attaining the course lear	ning outcomes. Lack			

		and critical abilities, logical and coherent anization and presentational skills are minir	thinking. Show very little or no ability to apmally effective or ineffective.	oply knowledge to solve	
Course Type	Lecture-based course				
Course Teaching & Learning Activities	Activities	Details		No. of Hours	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
Required/recommended reading and online materials	TBC				

PHYS7351	Graduat	e quantum mechani	ics (6 credits)	Academic Yea	r 2017	
Offering Department	Physics			Quota		
Course Co-ordinator	Prof S Q S	Shen, Physics (sshen@h	hku.hk)			
Teachers Involved		Shen,Physics)				
Course Objectives	This cours	e introduces postgradu	ates and senior undergraduate	es to theory and advanced tech	niques in quantum	
			to select topics in condensed r			
Course Contents				um dynamics, the second quar		
& Topics				l particles, perturbation and	scattering theory,	
		ntroduction of relativistic quantum mechanics.				
Course Learning			course, students should be able			
Outcomes			blems in quantum mechanics u			
			properties of identical quantur			
			symmetry and conservation la			
	CLO 4	explain physical phenon	nena in the modern language o	of quantum mechanics		
	CLO 5	analyse physical system	n in a quantum mechanical way	1		
	CLO 6	recognise the connectio	n between relativity and quant	um mechanics		
Pre-requisites	Pass in Pl	HYS4351				
(and Co-requisites						
and Impermissible						
combinations)						
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	:019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and				
	В	presentational skills.  B Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes.				
	Р	Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some				
		unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning				
		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.					
	-	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply				
	knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve					
	problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	•	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			80	
Assessment Methods	Methods	•	Details	Weighting in final	Assessment	
and Weighting				course grade (%)	Methods	
0 0				grame (70)	to CLO Mapping	
	Assignme	nts		30	CLO 1,2,3,4,5,6	
	Examinat		3-hour written exam	70	CLO 1,2,3,4,5,6	
Required/recommended				. 0	,_,,,,,,,,	
reading and			echanics (Addison-Wesley, 19	94)		

PHYS7450	Graduate electromagnetism (6 credits)	Academic Year	2017					
Offering Department	Physics	Quota						
Course Co-ordinator	Prof Z D Wang, Physics (zwang@hku.hk)							
Teachers Involved								
Course Objectives	The aim of this course is to provide students with the advanced level of comprehending on the theory of classic electromagnetic field, enabling them to master key analytical tools for solving real physics problems.							
Course Contents & Topics	This course will introduce and discuss the following topics: Boundary-value problems in electrostatics and Green Function method, Electrostatics of Media, Magnetostatics, Maxwell's equations and conservation laws, Gauge transformations, Electromagnetic waves and wave guides.							
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 analyse and solve various electrostatic and magnetostatic problems with Green's Function CLO 2 comprehend and explain many electromagnetic phenomena CLO 3 recognise and comprehend the important concepts of conservation laws and gauge transformations, which should be very helpful for doing research in future							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in PHYS4450							

Offer in 2017 - 2018	N Of	fer in 2018 - 2019 : Y		Examination		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	outcomes. Show evidence		and skills required for attaining most ies and logical thinking, and ability to a presentational skills.		
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no evi of analytical and critical a	dence of command of knowledge and	d skills required for attaining the course g. Show very little or no ability to ap		
Course Type	Lecture-b	ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading	ing / Self study		80		
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		30	CLO 1,2,3	
	Examina	tion	3-hour written exam	70	CLO 1,2,3	
Required/recommended reading and online materials		J.D. Jackson: Classical Electrodynamics (John Wiley & Sons, 1999) L.D. Landau and E.M. Lifshitz: Classical Theory of Fields (Pergamon, 1982)				

PHYS7550	Graduat	e statistical med	chanics (6 credits)	Academic	<b>Year</b> 2017		
Offering Department	Physics			Quota			
Course Co-ordinator	Prof J Wa	ng, Physics (jianwa	ng@hku.hk)				
Teachers Involved			· ·				
Course Objectives	This cours	se intends to introdu	ice some advanced topics in the f	ield of equilibrium statistical p	hysics.		
Course Contents	Ensemble	theory: the micro-	canonical ensemble, the canonic	cal ensemble, and the grand	d canonical ensemble		
& Topics			nble theory. Theory of simple gacting systems. Some topics in the				
Course Learning	On succes	ssful completion of t	this course, students should be ab	ole to:	•		
Outcomes	CLO 1 d	iscuss the various of	classical ensembles and quantum	ensembles			
	CLO 2 s	olve the statistical n	nechanics problems using ensemb	ole theory			
	CLO 3 e	xplain the connection	on between classical statistical me	echanics and quantum statistic	cal mechanics		
		xplain the concept of					
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in PHYS4550					
Offer in 2017 - 2018		er in 2018 - 2019 : \	Y	Examination	on		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ased course	· ·				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures						
•	Tutorials						
		Self study			12 80		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment		
	Assignme	ents		15	CLO 1,2,3,4		
	Examinat		3-hour written exam	70	CLO 1,2,3,4		
	Test			15	CLO 1,2,3,4		
Required/recommended reading and online materials	R.K. Path	otes provided by Co ria: Statistical mech se and B. Bergerser		,	, , , , , ,		

PHYS7551	Graduate solid state physics (6 credits)	Academic Year	2017
Offering Department	Physics	Quota	
Course Co-ordinator	Prof J Wang, Physics (jianwang@hku.hk)		
Teachers Involved			

Course Objectives	To provi	To provide students with an understanding of more advanced topics in selected areas of solid state physics.					
Course Contents		Bloch theory. Nearly free electrons and tight binding model. Band structure calculations for realistic systems. The					
& Topics		semi-classical model of electron dynamics. Ab initio total energy calculations and other advanced topics.  On successful completion of this course, students should be able to:					
Course Learning			•				
Outcomes	ι	used		tures and the major approximati	ons that have been		
		discuss various minimiza					
		discuss the concepts of d					
			st principle calculation and va	rious approximations used			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in I	Pass in PHYS3551 and PHYS4351					
Offer in 2017 - 2018	N O	ffer in 2018 - 2019 : N		Examination			
Grade Descriptors (A+ to F)	Α	learning outcomes. Show s	strong analytical and critical abilities	ensive knowledge and skills required for and logical thinking, with evidence of or d unfamiliar situations. Apply highly effe	iginal thought, and ability		
	В	Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective observation skills and techniques.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems using limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-	based course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures	S			36		
	Tutorials	S			12		
	Reading	g / Self study			80		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignn	nents		15	CLO 1,2,3,4		
	Examina	ation	3-hour written exam	70	CLO 1,2,3,4		
	Test			15	CLO 1,2,3,4		
Required/recommended reading and online materials	C. Kittel:	Lecture notes provided by Course Coordinator C. Kittel: Introduction to Solid State Physics (John Wiley, 1996) N.W. Ashcroft and D.N. Mermin: Solid State Physics (Holt, Rinehart and Winston, 1987)					
Omme materials	IN.VV. AS	INCIDIT AND D.N. MEHIIII.	Cona Giale i Hysics (Hoil, Kii	ichait and winston, 1907)			

PHYS7650	Stellar atmospheres (6 credits) Academic Year 201					2017	
Offering Department	Physics			Quota			
Course Co-ordinator	TBC, Phy	sics ()					
Teachers Involved	(TBC,Phy	sics)					
Course Objectives	TBC TBC						
Course Contents & Topics							
Course Learning Outcomes	On succes	On successful completion of this course, students should be able to:					
Pre-requisites (and Co-requisites and Impermissible combinations)	TBC						
Offer in 2017 - 2018	N Off	er in 2018 - 2019 : N	N		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. Sh	now strong analytical and critical	el of extensive knowledge and il abilities and logical thinking, w miliar and unfamiliar situations.	ith evidence of origina	al thought, and ability	
	B Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, reasoned logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations using effective organizational and presentation skills.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective observation skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems using limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ased course					
Course Teaching & Learning Activities	Activities	5	Details			No. of Hours	
Assessment Methods and Weighting	Methods		Details		ting in final e grade (%) f	Assessment Methods to CLO Mapping	
Required/recommended reading and online materials	TBC						

PHYS7750	Nanophy	/sics (6 credits)		Academic Yea	ar 2017	
Offering Department	Physics			Quota		
Course Co-ordinator	Prof S J X	u, Physics (sjxu@hku.i	hk)			
Teachers Involved	(Prof S J X	(u,Physics)				
Course Objectives	physics, so wires and	uch as two-dimensiona nanotubes, zero-dimer	al electron gas, quanturnsional electron systems	ents know fundamental concepts and m Hall effects, one-dimensional electro s, single electron effects and quantum d	n system, quantun lots.	
Course Contents & Topics	Introduction to nano physics and quantum size effect. Dimensionalities and density of states. Optical and transport properties of two-dimensional electron gas formed at heterostructures and within novel graphene monolayers with external fields. Quantum Hall Effects. Physics of one-dimensional electron systems including carbon nanotubes and semiconductor nanowires. Fundamental physics of zero-dimensional electron systems. Single electron effects. Quantum dots and nanocrystals. Fundamental principles and applications of scanning tunneling microscopy in the study of nano physics. If time permits, the making and application aspects of nanomaterials will also be discussed.					
Course Learning	On succes	sful completion of this	course, students should	be able to:		
Outcomes	CLO 1 red	call basic concepts and	d knowledge of dimension	onality, density of states, quantum size	effect	
	CLO 2 ide	entify and compare optoperially quantum Hall	tical and transport prope effects	erties of two-dimensional electron gas v	with external fields	
	stu	udy of nano physics	<u> </u>	tant applications of scanning tunneling	. ,	
	se	miconductor nanowire	S	al electron systems including carbon		
				nal quantum dots and nanocrystals, sing	gle electron effects	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ph	HYS3551 and PHYS43	51			
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N		Examination		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		10	CLO 1,2,3,4,5	
	Essay			20	CLO 1,2,3,4,5	
	Examinati	on		70	CLO 1,2,3,4,5	
Required/recommended reading and online materials			se Coordinator		, ,2,0,1,0	

ENVS3006	Environmental radiation (6 credits)	Academic Year	2017			
Offering Department	Physics	Physics Quota				
Course Co-ordinator	Dr J K C Leung, Physics (jkcleung@hku.hk)					
Teachers Involved	(Dr J K C Leung, Physics)					
Course Objectives	n this course, students will learn about various kinds of radiations in the environment, the experimental techniques of detect them, the methods to trace them and to assess their hazard to the environment, and the ways to reduce the hazard in events of nuclear accidents or incidents.					
Course Contents & Topics	The course will cover naturally occurring radiation sources and man-made radiation sources including nuclear power plants; transport models for radionuclides in the environment; nuclear accidents and its impact to the environment; radiation risk assessment and emergency preparedness; techniques for measuring low level radioactivities; nuclear techniques in ecology; concept of radiation protection to human species and non-human species.					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 realise sources and transport of radionuclides in the environment  CLO 2 explain and assess the impact to the environment from the use of nuclear energies  CLO 3 detect and measure low level radioactivities in environmental samples  CLO 4 justify, optimize, and assess the risk of using radiation and nuclear technologies  CLO 5 compare and contrast the environmental impacts from nuclear energy and other forms of energy					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM2041 or ENVS2001 or ENVS2002 or PHYS2265					

Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N		Examination			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D	Show evidence of some column knowledge to solve probler	herent and logical thinking, but with lir	Is required for attaining some of the content analytical and critical abilities. Shorganizational and presentational skills of the appropriate conclusions.	ow limited ability to apply		
	Fail	Demonstrate little or no evidor analytical and critical a problems. Organization and	monstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve blems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab is and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.				
Course Type	Lecture wi	th laboratory componer					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures			36			
	Laboratory				2		
	Field work				8		
	Tutorials				8		
	Reading /	Self study			80		
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts		20	CLO 1,2,4,5		
	Examinati	on	2-hour written exam	60	CLO 1,2,4,5		
	Laborator	y reports		10	CLO 2,3		
	Presentation			10	CLO 2,4,5		
Required/recommended reading and online materials	(Academic Robert C.	cademic Press, 1997)  bert C. Morris: The Environmental Case for Nuclear Power (Paragon House, 2000)  avid Bodansky: Nuclear Energy - Principles, Practices and Prospects (American Institute of Physics Press, 1996)					
Course Website		dle.hku.hk			,		

ENVS3010	Sustair	nable energy and en	vironment (6 credits)	Academic Ye	ar 2017		
Offering Department	Physics		. ,	Quota			
Course Co-ordinator	Prof A B	Djurisic, Physics (dalek@	Dhku.hk)				
Teachers Involved	(Prof A E	B Djurisic,Physics)					
Course Objectives	technolo technolo	gies, including convention	onal energy sources as well	y and environmental impact of as renewable and/or clean e d environmental impacts (comn	nergy sources. The		
Course Contents & Topics	making t	The course will cover energy production and use, environmental impact of energy use, fossil fuels and methods for making them more sustainable, clean fuels, electricity generation, renewable energy technologies (with emphasis on biomass, wind and solar energy), hydrogen, energy storage, and energy conservation.					
Course Learning	On succ	essful completion of this	course, students should be at	ole to:			
Outcomes	CLO 1	define the concept of su	•				
	CLO 2	·	•	of various energy technologies			
	CLO 3	· · · · · · · · · · · · · · · · · · ·	ntal impact of conventional ar	0, 0			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (	CHEM2041 or ENVS200 <sup>-</sup>	1 or ENVS2002 or PHYS2260	)			
Offer in 2017 - 2018	Y 2r	nd sem Offer in 2018 - 2	2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	В	learning outcomes. Show s to apply knowledge to a w presentational skills.  Demonstrate substantial co	strong analytical and critical abilities a vide range of complex, familiar and command of a broad range of knowle	uniform is in the size of the	iginal thought, and abilit ective organizational and least most of the course		
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail	of analytical and critical a		d skills required for attaining the course ag. Show very little or no ability to ap ffective or ineffective.			
Course Type	Lecture-l	based course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures	S			36		
	Tutorials				12		
	Reading	g / Self study			80		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods		

	Assignments	debate questions performance	10	CLO 1,2,3	
	Examination	2-hour written exam	50	CLO 1,2,3	
	Presentation		40	CLO 2,3	
Required/recommended reading and online materials	d Lecture notes provided by Course Coordinator Godfrey Boyle: Renewable Energy: Power for a Sustainable Future (Oxford University Press, 2003) G. Boyle, B. Everett, and J. Ramage: Energy Systems and Sustainability: Power for a Sustainable Future (Th Open University, 2003) R. M. Dell and D. A. J. Rand: Clean Energy (The Royal Society of Chemistry, 2004)				
Course Website	http://moodle.hku.hk				

SCNC1111	Scientifi	c method and reasoning (6 credits)	Academic Year	2017			
Offering Department	Faculty		Quota				
Course Co-ordinator		m, Statistics & Actuarial Science (hrntlkf@hku.hk)					
Teachers Involved		m,Statistics & Actuarial Science)					
		Lui,Faculty of Science)					
		Cheung, Faculty of Science)					
Course Objectives	,	tives are to give students a holistic view of the science disc	•	•			
		civilization and society; to equip students with basic skills or		reasoning; and to			
	introduce	to students mathematical and statistical methods for science s	studies and research.				
Course Contents		e nature and methodology of science					
& Topics		ation between science and non-science					
		eatures of the sciences					
	- Scientific						
	- The role	of mathematics in the historical development of science					
		antitative reasoning					
		natics with topics selected from					
		on of mathematics,					
		atics and advancement of science - an introduction,					
	- Guesstin	atical modelling - an introduction,					
		e equations.					
		gebra and matrices,					
		and differential equations, and/or					
		and Chaos.					
	. radiais	a					
	b. Statistic	CS .					
	- Probabili						
		stic methods					
		al inference					
		ice intervals estimation					
	- Hypothe						
	7.	making with statistics					
		al modelling, and use and misuse of statistics					
Course Learning		ssful completion of this course, students should be able to:					
Outcomes		escribe key aspects of scientific methodology					
		escribe the key elements of the foundation of mathematics and	I statistics				
		entify the mathematics that underlies scientific problems					
	CLO 4 apply logical and quantitative reasoning to re-formulate both real life and scientific problems in						
		athematical terms, and to interpret their solutions	on roar mo and coloni	ino probiotilo in			
Pre-requisites	NIL	F					
and Co-requisites		rse is compulsory for all students taking a Science major of	fered by the Faculty of :	Science Students			
and Impermissible		te this course in their first year.)	.o.ou by the raddity of				
combinations)		, ,					
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offer in 2018 - 2019 : Y	Examination	Dec May			
Grade Descriptors	Α	Demonstrate thorough mastery of extensive knowledge and skills required	for attaining all the course lea				
(A+ to F)		strong analytical and critical abilities and logical thinking, and ability to appl					
•	Ь	situations. Carry out computations carefully and correctly. Apply highly effect					
	Р	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar					
		learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Carry out computations mostly in a careful and correct way, but commit some minor					
		computational errors. Apply effective organizational and presentational skill					
	С	Demonstrate general but incomplete command of knowledge and skills outcomes. Show evidence of some analytical and critical abilities and log					
		familiar situations. Commit a number of minor computational errors. Apply					
		skills.		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
			I for attaining some of the cour	ea laarning outcomes			
	D	Demonstrate partial but limited command of knowledge and skills required					
	D	Show evidence of some coherent and logical thinking, but with limited analysis	ytical and critical abilities. Show	limited ability to apply			
	D		ytical and critical abilities. Show	limited ability to apply			
	D Fail	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational error presentational skills.  Demonstrate little or no evidence of command of knowledge and skills requ	ytical and critical abilities. Show ors. Apply limited or barely effect uired for attaining the course lea	limited ability to apply tive organizational and arning outcomes. Lack			
		Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational erropresentational skills.  Demonstrate little or no evidence of command of knowledge and skills requoif analytical and critical abilities, logical and coherent thinking. Show we have the content thinking in the content thinking in the content thinking is the content thinking.	ytical and critical abilities. Show rs. Apply limited or barely effec- uired for attaining the course le- ery little or no ability to apply	limited ability to apply tive organizational and arning outcomes. Lack knowledge to solve			
	Fail	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational erropresentational skills.  Demonstrate little or no evidence of command of knowledge and skills requoif analytical and critical abilities, logical and coherent thinking. Show we problems. Commit serious computational errors. Organization and presentations.	ytical and critical abilities. Show rs. Apply limited or barely effec- uired for attaining the course le- ery little or no ability to apply	rlimited ability to apply tive organizational and arning outcomes. Lack r knowledge to solve			
	Fail Lecture-ba	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational erropresentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show we problems. Commit serious computational errors. Organization and presentations asset course	ytical and critical abilities. Show rs. Apply limited or barely effec- uired for attaining the course le- ery little or no ability to apply	I limited ability to apply tive organizational and arning outcomes. Lack Knowledge to solve tive or ineffective.			
Course Teaching	Fail Lecture-ba	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational erropresentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show we problems. Commit serious computational errors. Organization and presentations asset course	ytical and critical abilities. Show rs. Apply limited or barely effec- uired for attaining the course le- ery little or no ability to apply	limited ability to apply tive organizational and arning outcomes. Lack knowledge to solve tive or ineffective.			
Course Teaching	Fail Lecture-ba Activities Lectures	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational erropresentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show we problems. Commit serious computational errors. Organization and presentations asset course	ytical and critical abilities. Show rs. Apply limited or barely effec- uired for attaining the course le- ery little or no ability to apply	limited ability to applitive organizational and aming outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours  36			
Course Teaching	Fail Lecture-ba Activities Lectures Tutorials	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational errorpesentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show v problems. Commit serious computational errors. Organization and presents ased course  Details	ytical and critical abilities. Show rs. Apply limited or barely effec- uired for attaining the course le- ery little or no ability to apply	limited ability to apply tive organizational and arning outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours  36  12			
Course Teaching	Fail Lecture-ba Activities Lectures Tutorials	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational erropresentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show we problems. Commit serious computational errors. Organization and presentations asset course	ytical and critical abilities. Show rs. Apply limited or barely effec- uired for attaining the course le- ery little or no ability to apply	limited ability to applitive organizational and aming outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours  36			
Course Teaching & Learning Activities	Fail Lecture-ba Activities Lectures Tutorials	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational errorpesentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show v problems. Commit serious computational errors. Organization and presents ased course  Details	ytical and critical abilities. Show rs. Apply limited or barely effec- uired for attaining the course le- ery little or no ability to apply	limited ability to apply tive organizational and arning outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours  36  12			
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-b  Activities Lectures Tutorials Reading	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational errorpesentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show v problems. Commit serious computational errors. Organization and presents assed course  Details  Self study	ytical and critical abilities. Show rs. Apply limited or barely effec uired for attaining the course le- ery little or no ability to apply titional skills are minimally effect	limited ability to applitive organizational and arring outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours  36  12  100			
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  Lecture-b  Activities Lectures Tutorials Reading	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational errorpesentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show v problems. Commit serious computational errors. Organization and presents assed course  Details  Self study	ytical and critical abilities. Show rs. Apply limited or barely effective drives a course leave the course leave yittle or no ability to apply titional skills are minimally effective drives. Weighting in final	limited ability to apply tive organizational and aming outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours 36 12 100  Assessment Methods			
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-b  Activities Lectures Tutorials Reading	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational errorpesentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show v problems. Commit serious computational errors. Organization and presents assed course  Details  Self study	ytical and critical abilities. Show rs. Apply limited or barely effective drives a course leave the course leave yittle or no ability to apply titional skills are minimally effective drives. Weighting in final	limited ability to apply tive organizational and arming outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours  36  12  100  Assessment Methods			
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-b  Activities Lectures Tutorials Reading	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational error presentational skills.  Demonstrate little or no evidence of command of knowledge and skills reqiof analytical and critical abilities, logical and coherent thinking. Show verification problems. Commit serious computational errors. Organization and presents assed course  Details  Self study  Details  Coursework includes projects,	ytical and critical abilities. Show rs. Apply limited or barely effective drives a course leave the course leave yittle or no ability to apply titional skills are minimally effective drives. Weighting in final	limited ability to apply tive organizational and arming outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours  36  12  100  Assessment			
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading Methods	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational error presentational skills.  Demonstrate little or no evidence of command of knowledge and skills reqiof analytical and critical abilities, logical and coherent thinking. Show verification problems. Commit serious computational errors. Organization and presents assed course  Details  Self study  Details  Coursework includes projects,	vtical and critical abilities. Show rs. Apply limited or barely effec uired for attaining the course le- ery little or no ability to apply titional skills are minimally effect  Weighting in final course grade (%)	limited ability to apply tive organizational and aming outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours 36 12 100  Assessment Methods to CLO Mapping			
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading Methods	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational error presentational skills.  Demonstrate little or no evidence of command of knowledge and skills reqiof analytical and critical abilities, logical and coherent thinking. Show we problems. Commit serious computational errors. Organization and presents assed course  Details  Self study  Details  coursework includes projects, class tests, and participation in tutorials	vtical and critical abilities. Show rs. Apply limited or barely effec uired for attaining the course le- ery little or no ability to apply titional skills are minimally effect  Weighting in final course grade (%)	limited ability to apply tive organizational and aming outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours 36 12 100  Assessment Methods to CLO Mapping			
Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail  Lecture-ba Activities Lectures Tutorials Reading Methods  Assignment	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational errorpesentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show verification in tutorials  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show verification in tutorials  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show verification in tutorials	ytical and critical abilities. Show rs. Apply limited or barely effec uired for attaining the course let ery little or no ability to apply titional skills are minimally effect  Weighting in final course grade (%)	limited ability to apply tive organizational and arming outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours  36  12  100  Assessment Methods to CLO Mapping  CLO 1,2,3,4			
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading Methods  Assignment	Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Commit some substantial computational errorpesentational skills.  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show verification in tutorials  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show verification in tutorials  Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show verification in tutorials	ytical and critical abilities. Show rs. Apply limited or barely effec uired for attaining the course let ery little or no ability to apply titional skills are minimally effect  Weighting in final course grade (%)	limited ability to apply tive organizational and aming outcomes. Lack / knowledge to solve ive or ineffective.  No. of Hours 36 12 100  Assessment Methods to CLO Mapping CLO 1,2,3,4			

SCNC1112	Fundamentals of modern science (6 credits)	Academic Year	2017
Offering Department	Faculty	Quota	
Course Co-ordinator	Dr J C S Pun, Physics (jcspun@hku.hk)		
Teachers Involved	(Dr G W Porter, Faculty of Science) (Dr J C S Pun, Physics)		

reading and continuing materials	Textbook: Sciences: An Integrated Approach by Trefil & Hazen 7th Edition (2013, Wiley) References: Integrated Science by Tillery, Enger, & Ross 5th Edition (2011, McGrawHill) Biology: Concepts and Connections by Campbell, Mitchell, & Reece 2nd Edition (1999, Benjamin/Cummings) Chemistry: An Atoms First Approach by Zumdahl & Zumdahl (2012 Cengage)					
Required/recommended	Test	Sciences: An Inte	egrated Approach by Trofil 9 Hozas 7	th Edition (2013, Wiley)	CLO 1,2,3,4,5	
	Presentat		project presentation	20	CLO 1,2,3,4,5	
	Assignme Examinat		tutorials and homework	20 50	CLO 1,2,3,4,5 CLO 1,2,3,4,5	
	Acciana	onto	tutorials and homowork	20	to CLO Mapping	
and Weighting	wellious		Detail2	course grade (%)	Methods	
Assessment Methods	Methods		1 hour in-class quiz  Details	Weighting in final	Assessment	
	Reading /	/ Self study	1 hour in-class quiz		94	
	Tutorials	/ Colf of and			12	
& Learning Activities	Lectures				36	
Course Teaching	Activities	5	Details		No. of Hours	
		ith laboratory com				
	Fail	knowledge to solve appropriate conclusi Demonstrate little or of analytical and or problems. Apply mir to draw appropriate	ome coherent and logical thinking, but with limi problems. Apply partially effective lab skills at ons. Apply limited or barely effective organizati r no evidence of command of knowledge and sritical abilities, logical and coherent thinking. inimally effective or ineffective lab / fieldwork sk conclusions. Organization and presentational s	nd techniques. Limited ability to use onal and presentational skills. skills required for attaining the course Show very little or no ability to ap- cills and techniques. Misuse of data a	data and results to drave learning outcomes. Lack ply knowledge to solve and results and/or unable	
	C	Demonstrate general outcomes. Show ever familiar situations. A results to draw appropriate partial	effective organizational and presentational skills al but incomplete command of knowledge a idence of some analytical and critical abilities apply moderately effective lab skills and tech opriate conclusions. Apply moderately effective but limited command of knowledge and skills	nd skills required for attaining mos and logical thinking, and ability to a niques. Mostly correct but some er corganizational and presentational sk required for attaining some of the co	apply knowledge to mos oneous use of data and ills. ourse learning outcomes	
	В	results to draw appropriate substate learning outcomes. and some unfamilia	opriate and insightful conclusions Apply highly initial command of a broad range of knowledg Show evidence of analytical and critical abilities ir situations. Apply effective lab skills and tec	effective organizational and presenta e and skills required for attaining at s and logical thinking, and ability to a chiques. Correct use of data of res	tional skills. least most of the cours oply knowledge to familia	
Grade Descriptors (A+ to F)	A	Demonstrate thoroustrong analytical and	Office III 2016 - 2019 . If gh mastery of extensive knowledge and skills d critical abilities and logical thinking, with evi- lex, familiar and unfamiliar situations. Apply high	required for attaining all the course I dence of original thought, and ability	earning outcomes. Show to apply knowledge to	
combinations) Offer in 2017 - 2018	Y 1st	sem 2nd sem	Offer in 2018 - 2019 : Y	Examination	Dec May	
and Co-requisites and Impermissible	(This coul	rse is compulsory ce this course in th	r for all students taking a Science meir first year.)	ajor offered by the Faculty o	of Science. Student	
Pre-requisites	NIL a	form of life-long le	aming			
	CLO 4 cr	evelop curiosity in	ely appraise received ideas and estat science and an appreciation of scien		ence Majors and as	
	CLO 2 ur CLO 3 ap	nderstand and be opreciate the diver	thods, and the role of science in the a familiar with the fundamental scientific rsity of different scientific disciplines	principles and concepts		
Course Learning Outcomes		•	f this course, students should be able anding of the historical developmen		sence and spirit of	
		the Sun, and the	solar system			
	(7) Earth a - Solid Ea	and environment and Beyond rth, Earth's atmos notion in space	phere and hydrosphere			
	(5) Cells a (6) Organi - The origi	and systems ism and environm in and evolution o				
	<ul><li>Importar</li><li>Nanoscie</li><li>(4) DNA/G</li><li>Molecule</li></ul>	ence and nanotec Senetic es of life	r, carbon, molecular cluster hnology			
	- The quar - Elementa (3) Atoms - Matters a	e of matter ntum world ary particles and s and molecules and atoms: The pe	eriodic table			
& Topics	(1) Univer (2) Funda	sal principles and mental structure o	unifying concepts of science			
	course adopts an integrated approach and encompasses physics, astronomy, earth sciences, chemistry, and biology, and focuses on the general principles and unifying concepts of science used in various disciplines to describe the diverse phenomena and objects in the natural world. The fundamental laws of each discipline, the historical developments and the modern frontiers, and the interconnectedness of different science disciplines will be introduced and highlighted.					
	course ac	lante an integrate	ad approach and appearance of phy	sics astronomy earth scien	ces chemistry and	

	The big history of our planet: a scientific perspective on everything that has ever happened (6 credits)	Academic Year	2017	

Offering Department	Faculty			Quota	50		
Course Co-ordinator		Cheung, Faculty (willmy	/c@hku.hk)				
Teachers Involved		Cheung, Faculty of Science	ence)				
0		Parker, Physics)	along the forms the Dia Done of the Health		-l:ff		
Course Objectives	By exploring the Big History of our planet: from the Big Bang of the Universe, the synthesis of different chemical substances, through the evolution of various species on Earth, to the establishment of modern human society, the course aims to:						
	(1) discus establishe	ss the process of scier d;	ntific discovery, and how our current	,	oout Nature was		
	(3) develo policies in	p students' understand	ng of the multi-disciplinary nature of scie ing of the importance of science and the the future problems of our planet;		ty, in formulating		
Course Contents		m the Cosmos to the Ato	om				
& Topics	Main them know it;	ne: How fundamental int	eractions between the building blocks of				
		n of our planet Earth.	ynthesis, cosmic expansion, cooling of	the universe, star forma	ation, and therma		
	Part II: Fro	om the Atom to Life					
			the transition from non-living matter to the stransition, natural selection and tree of life.	ne diversified biosphere	on earth today;		
	Main them of knowled	dge; how science, techno	ety lised society emerges through the deve ology, human society and environment in not the emergence of intelligence, histor	nfluence one another;			
	role of scie	ence in human civilisatio	n and the contemporary world.				
	Main them faced by h	numankind that could be	e of science, technology, human societ addressed by science and technology; ad one of several parallel modules on to	•	· ·		
			gy crisis, bioethics and artificial intelligen	ce.			
Course Learning Outcomes			course, students should be able to:	the development and	formation of aun		
Dutcomes	CLO 1 appreciate and elaborate on the significance of major events in the development and formation of our Universe, our Earth system and our modern society						
	CLO 2 explain, with some level of depth and details, how a number of major theories allows us to understand the workings of the world						
	CLO 3 understand how different science disciplines fit and emerge from one another as a collective effort of the humankind to understand Nature						
	CLO 4 critically assess the mutual influence between science and human society, th society as well as the making of science policy in our local region  CLO 5 evaluate some of the major challenges faced by humankind, and discuss solution perspective						
	CLO 6 tes	st claims and engage in	historical analysis based on theories an	d practices from multiple	e disciplines		
Pre-requisites (and Co-requisites and Impermissible	Combined	/Integrated Science or e	science subject at the pre-university levequivalent) nts in the 6901 BSc or 6119 BEd&BSc	•	hemistry, Biology		
combinations) Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	010 · V	Examination	No Exam		
Grade Descriptors	A 2110		tery of extensive knowledge and skills required fo				
(A+ to F)	В	situations. Carry out comput Demonstrate substantial collearning outcomes. Show ev	abilities and logical thinking, and ability to apply k ations carefully and correctly. Apply highly effective mand of a broad range of knowledge and skills idence of analytical and critical abilities and logica- tions. Carry out computations mostly in a cal	re organizational and present is required for attaining at lea al thinking, and ability to apply	ational skills. st most of the course knowledge to familiar		
	С	and some unfamiliar situations. Carry out computations mostly in a careful and correct way, but commit some minor computational errors. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Commits a wayber of price computering logical expensions and product the production of productions and product the production of the production o					
	D	familiar situations. Commit a number of minor computational errors. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply					
	Fail	knowledge to solve problem presentational skills.	s. Commit some substantial computational errors.  lence of command of knowledge and skills require	Apply limited or barely effect	ive organizational and		
	411	of analytical and critical at	oilities, logical and coherent thinking. Show ver omputational errors. Organization and presentation	y little or no ability to apply	knowledge to solve		
Course Type	Lecture-ha	ased course	Sp.Sauoriai orroro. Organizauori anu presentatio	omio are minimally enecti	or moneouve.		
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
		Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	About 3 reading assignments will be given. Students will then be assessed in various forms such as drawing mind maps, short quizzes	40	CLO 1,2,3,4,5,6		
	Presentat	ion	or reflective journals.  Tutorial participation	10	CLO		

				1,2,3,4,5,6
	Project reports		30	CLO 1,3,4,5,6
	Test		20	CLO 1,2,3,4,6
Required/recommended reading and online materials	Charles Darwin: The Origin of Spe Eric R. Kandel: In Search of Memo Fred Spier: Big history and the futu	ry: The Emergence of a New Science of the Interest of humanity (Wiley-Blackwell) and Craig Benjamin: Big History: Between ages)	of Mind (W. W. Norton	& Company)

SCNC2121	Sustaina	able food productio	n (6 credits)	Academic Year	2017		
Offering Department	Faculty		(	Quota	32		
Course Co-ordinator		-Nezami, Biological Scie	ences (elnezami@hku.hk)	1 44.2.0	1		
Teachers Involved			Land and Food Systems)				
		I-Nezami, Biological Scie					
Course Objectives	This cours	se is designed to provide	e students with the opportunity to experie	ence the inner-working	s of a sustainabl		
			to make connections between the ecos				
	communit	ies surrounding the farr	<ul> <li>Students will participate in plenary ses</li> </ul>	ssions with course ins	tructors and gue		
	lecturers 1	from the UBC Faculty of	of Land and Food Systems, in guided of	group discussions, fiel	d trips on and o		
			nal, hands-on farming activities.				
Course Contents			f the UBC Faculty of Land and Food S				
& Topics			, and morning group discussion sessions				
			activities, including afternoon group dis				
			chance to explore the UBC campus su				
			CIRS green building, Place Vanier, hom ject in the Student Union Building/SUB.				
		. ,	arket and to Granville Island Public Ma		•		
			nally grounded food system context.	irket to provide a coi	iipaialive view		
	marketing	, systems and the region	any grounded rood system context.				
	The main	approach to learning v	vith this course is student-centered learn	ning and hands-on exi	perience. To me		
			nts are expected to attend and participa				
		0,	presentation, and to complete a series of	,			
	main cour	rse themes-soils, biodive	ersity, seeds, marketing.	•			
Course Learning	On succes	ssful completion of this of	course, students should be able to:				
Outcomes	CLO 1 cc	onnect underlying agroe	cosystem concepts and soil science fun	damentals with princip	oles and practice		
		f sustainable farming					
	CLO 2 ob	oserve and compare mu	Itiple models of agricultural food production	on in an urban and car	npus farm settinເ		
	CLO 3 ide	entify multiple strategies	s for creating on-farm biodiversity				
	CLO 4 de	emonstrate a basic unde	erstanding of composting fundamentals				
	CLO 5 de	emonstrate the ability to	perform a select set of basic crop main	tenance, harvest, was	hing, and packin		
		chniques in a sustainabl					
	CLO 6 de	emonstrate best practice	es with post-harvest handling and food sa	fety protocols			
Pre-requisites	Students	are expected to have p	assed at least 30 credits of level 1 and/o	or level 2 science coul	rses. Students w		
(and Co-requisites	also need	to pass an interview in	order to be enrolled in the course.				
and Impermissible							
combinations)							
Offer in 2017 - 2018		er in 2018 - 2019 : Y		Examination			
Grade Descriptors	A		e basics from sustainable farming to marketing str				
(A+ to F)		Ability to perform crop maintenance, harvest, washing, and packing in a sustainable campus farm setting. Ability to del solid team-based skills for performance of fieldwork, and distinct performance in different assessment components.					
		synthesize the lessons learned during the course and articulate individual learning objectives for further studies in agriculture					
	_	food and human health.					
	В	B Clear understanding of the basics from sustainable farming to marketing strategies used by sustainable farming operation  Ability to perform crop maintenance, harvest, washing, and packing in a sustainable campus farm setting. Ability to demonstra					
		solid team-based skills for performance of fieldwork, and distinct performance in different assessment components.					
		C Understanding of the basics from sustainable farming to marketing strategies used by sustainable farming operations. Ability to					
	C			used by sustainable farming	g operations. Ability		
	C	perform crop maintenance,	harvest, washing, and packing in a sustainable ca	used by sustainable farming ampus farm setting. Satisfa	g operations. Ability ctory demonstration		
		perform crop maintenance, team-based skills for perform		used by sustainable farming ampus farm setting. Satisfar different assessment comp	g operations. Ability ctory demonstration onents.		
	D	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment compo	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in s of sustainable farming. Active participation in team onents.	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration conents. factory performance		
	D Fail	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment compo Fail to follow the basics of s	harvest, washing, and packing in a sustainable camance of fieldwork, and satisfactory performance in s of sustainable farming. Active participation in team	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration conents. factory performance		
	D Fail Field cam	perform crop maintenance, team-based skills for perforn Knowing some of the basics different assessment compo Fail to follow the basics of s	harvest, washing, and packing in a sustainable camance of fieldwork, and satisfactory performance in s of sustainable farming. Active participation in teamonents. sustainable farming as demonstrated by unsatisfactors.	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork.		
Course Teaching	D Fail Field cam Activities	perform crop maintenance, team-based skills for perforn Knowing some of the basics different assessment compo Fail to follow the basics of s	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in s of sustainable farming. Active participation in team onents.	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork. No. of Hours		
Course Teaching	D Fail Field cam Activities Lectures	perform crop maintenance, team-based skills for perforn Knowing some of the basics different assessment compc Fail to follow the basics of stages.	harvest, washing, and packing in a sustainable camance of fieldwork, and satisfactory performance in s of sustainable farming. Active participation in teamonents. sustainable farming as demonstrated by unsatisfactors.	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork.  No. of Hours 20		
Course Teaching	D Fail Field cam Activities	perform crop maintenance, team-based skills for perforn Knowing some of the basics different assessment compc Fail to follow the basics of stages.	harvest, washing, and packing in a sustainable camance of fieldwork, and satisfactory performance in s of sustainable farming. Active participation in teamonents. sustainable farming as demonstrated by unsatisfactors.	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork. No. of Hours		
Course Teaching	Fail Field cam Activities Lectures Field worl Presental	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment compt Fail to follow the basics of stages.	harvest, washing, and packing in a sustainable camance of fieldwork, and satisfactory performance in s of sustainable farming. Active participation in teamonents. sustainable farming as demonstrated by unsatisfactors.	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork.  No. of Hours 20		
Course Teaching	Fail Field cam Activities Lectures Field worl Presental Reading	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment compt Fail to follow the basics of states and the performance of the basics of states are seen as the performance of t	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in tean onents.  Bustainable farming as demonstrated by unsatisfactors.  Details  Group discussion / Project	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration conents. factory performance ents and/or fieldwork.  No. of Hours 20 50 10 50		
Course Teaching	Fail Field cam Activities Lectures Field worl Presental	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment compt Fail to follow the basics of states and the performance of the basics of states are seen as the performance of t	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in tean onents.  Sustainable farming as demonstrated by unsatisfactor	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork.  No. of Hours 20 50 10		
Course Teaching & Learning Activities  Assessment Methods	Fail Field cam Activities Lectures Field worl Presental Reading	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment compt Fail to follow the basics of states and the performance of the basics of states are seen as the performance of t	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in tean onents.  Bustainable farming as demonstrated by unsatisfactors.  Details  Group discussion / Project	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis	g operations. Ability ctory demonstration conents. factory performance ents and/or fieldwork.  No. of Hours 20 50 10 50		
Course Teaching & Learning Activities  Assessment Methods	Fail Field cam Activities Lectures Field worl Presental Reading / Assessmi	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment compt Fail to follow the basics of states and the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to fail	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teamonents.  Bustainable farming as demonstrated by unsatisfactors are properly as a demonstrated by unsatisfactors.  Details  Group discussion / Project  End of trip report	used by sustainable farmin ampus farm setting. Satisfar different assessment comp n-based fieldwork, and satis bry performance in assignment	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork.  No. of Hours 20 50 10 50 30		
Course Teaching & Learning Activities  Assessment Methods	Fail Field cam Activities Lectures Field worl Presental Reading / Assessmi	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment compt Fail to follow the basics of states and the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to fail	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teamonents.  Bustainable farming as demonstrated by unsatisfactors between the properties of the properties.  Group discussion / Project  End of trip report	used by sustainable farmin ampus farm setting. Satisfa d different assessment comp n-based fieldwork, and satis bry performance in assignment Weighting in final	g operations. Ability ctory demonstration conents. factory performance ents and/or fieldwork.  No. of Hours 20 50 10 50 30  Assessmen Methods to CLO		
Course Teaching & Learning Activities  Assessment Methods	Fail Field cam Activities Lectures Field worl Presental Reading / Assessmi	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment compt Fail to follow the basics of states and the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to follow the basics of states are seen to see the fail to fail	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in s of sustainable farming. Active participation in teamonents.  Bustainable farming as demonstrated by unsatisfactor  Details  Group discussion / Project  End of trip report  Details	used by sustainable farmin ampus farm setting. Satisfa d different assessment comp n-based fieldwork, and satis bry performance in assignment Weighting in final	g operations. Ability ctory demonstration conents. factory performance ents and/or fieldwork.  No. of Hours 20 50 10 50 30  Assessmen Methods		
Course Teaching & Learning Activities  Assessment Methods	Fail Field cam Activities Lectures Field worl Presental Reading Assessm Methods	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment comporal to fail to follow the basics of sips significant statements and the statements of the statement of the statements o	harvest, washing, and packing in a sustainable camance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teamonents.  Details  Group discussion / Project  End of trip report  Details  To be announced by UBC Faculty of	used by sustainable farmin ampus farm setting. Satisfa d different assessment comp n-based fieldwork, and satis bry performance in assignment Weighting in final course grade (%)	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork  No. of Hours 20 50 10 50 30  Assessmen Methods to CLO Mapping		
Course Teaching & Learning Activities  Assessment Methods	Fail Field cam Activities Lectures Field worl Presental Reading / Assessmi	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment comporal to fail to follow the basics of sips significant statements and the statements of the statement of the statements o	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teamonents.  Details  Details  Group discussion / Project  End of trip report  Details  To be announced by UBC Faculty of Land and Food Systems	used by sustainable farmin ampus farm setting. Satisfa d different assessment comp n-based fieldwork, and satis bry performance in assignment Weighting in final	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork  No. of Hours 20 50 10 50 30  Assessmen Methods to CLO Mapping		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail Field cam Activities Lectures Field worl Presental Reading Assessm Methods	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment comporal to fail to follow the basics of sips significant statements and the statements of the statement of the statements o	harvest, washing, and packing in a sustainable commance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teanonents.  Bustainable farming as demonstrated by unsatisfactory performance in sustainable farming as demonstrated by unsatisfactory performance.  Details  Group discussion / Project  End of trip report  Details  To be announced by UBC Faculty of Land and Food Systems  Students will divided into groups of	used by sustainable farmin ampus farm setting. Satisfa d different assessment comp n-based fieldwork, and satis bry performance in assignment Weighting in final course grade (%)	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork  No. of Hours 20 50 10 50 30  Assessmen Methods to CLO Mapping		
Course Teaching & Learning Activities  Assessment Methods	Fail Field cam Activities Lectures Field worl Presental Reading Assessm Methods	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment comporal to fail to follow the basics of sips significant statements and the statements of the statement of the statements o	harvest, washing, and packing in a sustainable or mance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teamonents.  Betails  Group discussion / Project  End of trip report  Details  To be announced by UBC Faculty of Land and Food Systems  Students will divided into groups of 3-4. Each group will submit a 7-10	used by sustainable farmin ampus farm setting. Satisfar different assessment compon-based fieldwork, and satisfory performance in assignment with the satisfarm of the satisfarm	g operations. Ability ctory demonstration conents. factory performance ents and/or fieldwork.  No. of Hours 20 50 10 50 30 Assessmen Methods to CLO Mapping CLO 1,2,4,5		
Course Teaching & Learning Activities  Assessment Methods	Fail Field cam Activities Lectures Field worl Presental Reading Assessm Methods	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment comporal to fail to follow the basics of sips significant statements and the statements of the statement of the statements o	harvest, washing, and packing in a sustainable or mance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teamonents.  Details  Group discussion / Project  End of trip report  Details  To be announced by UBC Faculty of Land and Food Systems  Students will divided into groups of 3-4. Each group will submit a 7-10 pages report (not including the	used by sustainable farmin ampus farm setting. Satisfa d different assessment comp n-based fieldwork, and satis bry performance in assignment Weighting in final course grade (%)	g operations. Ability ctory demonstration conents. factory performance ents and/or fieldwork.  No. of Hours 20 50 10 50 30  Assessmen Methods to CLO Mapping		
Course Teaching & Learning Activities  Assessment Methods	Fail Field cam Activities Lectures Field worl Presental Reading Assessm Methods	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment comporal to fail to follow the basics of sips significant statements and the statements of the statement of the statements o	harvest, washing, and packing in a sustainable or mance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teamonents.  Details  Group discussion / Project  End of trip report  Details  To be announced by UBC Faculty of Land and Food Systems Students will divided into groups of 3-4. Each group will submit a 7-10 pages report (not including the references). Please refer to	used by sustainable farmin ampus farm setting. Satisfar different assessment compon-based fieldwork, and satisfory performance in assignment with the satisfarm of the satisfarm	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork  No. of Hours 20 50 10 50 30 Assessmen Methods to CLO Mapping CLO 1,2,4,5		
Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail Field cam Activities Lectures Field worl Presentat Reading / Assessm Methods  Report	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment comportable Fail to follow the basics of sips selections. The selection of the selection	harvest, washing, and packing in a sustainable or mance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teamonents.  Details  Group discussion / Project  End of trip report  Details  To be announced by UBC Faculty of Land and Food Systems Students will divided into groups of 3-4. Each group will submit a 7-10 pages report (not including the references). Please refer to Remarks for format requirements.	weed by sustainable farminampus farm setting. Satisfact of different assessment compon-based fieldwork, and satisfory performance in assignment of the setting of the setti	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork  No. of Hours 20 50 10 50 30 Assessmen Methods to CLO Mapping CLO 1,2,4,5		
Course Teaching Learning Activities Assessment Methods and Weighting	Fail Field cam Activities Lectures Field worl Presentat Reading / Assessm Methods  Report	perform crop maintenance, team-based skills for perform Knowing some of the basics different assessment comportable Fail to follow the basics of sips selections. The selection of the selection	harvest, washing, and packing in a sustainable or mance of fieldwork, and satisfactory performance in so of sustainable farming. Active participation in teamonents.  Details  Group discussion / Project  End of trip report  Details  To be announced by UBC Faculty of Land and Food Systems Students will divided into groups of 3-4. Each group will submit a 7-10 pages report (not including the references). Please refer to	weed by sustainable farminampus farm setting. Satisfact of different assessment compon-based fieldwork, and satisfory performance in assignment of the setting of the setti	g operations. Ability ctory demonstration onents. factory performance ents and/or fieldwork  No. of Hours 20 50 10 50 30 Assessmer Methods to CLO Mapping CLO 1,2,4,4		

Course Website	http://www.scifac.hku.hk/news/bsc/ubc-summer-course
Additional Course Information	Please note: Students have to cover their own travel costs and course fees charged by the hosting institution (prices to be announced).  This course will be offered subject to a minimum enrollment number and availability of teachers.  Enrolment of this course is not conducted via the online course selection system. Students will be enrolled manually by the Faculty after approval has been obtained from the course coordinator.  This course is taught by staff in UBC and the end of trip report is graded by Dr H S El-Nezami.
	Remarks: Students will divided into groups of 3-4. Each group will submit a 7-10 pages report (not including the references). Please use Times New Roman (12 points), single space and 2 cm margins from all sides. The report should summarize the group HACCP plan, issues, problems and approaches and suggestions to address any farm related food safety issues. The marking criteria are the scientific quality and clear identification of the issues listed above. In addition each group will be presenting 12-15 minutes on the topic of their report.

SCNC2122		Marine life science: a North East Pacific perspective (6 credits)  Academic Year				
Offering Department	Faculty			Quota	32	
Course Co-ordinator	Dr T Ven	gatesen, Biological Scien	ices (rajan@hku.hk)			
Teachers Involved	(Prof G A (Prof R S	gatesen,Biological Scier Williams,Biological Sciel S Wu,Biological Science wok,Earth Sciences)	nces)			
Course Objectives	biology th will learn interaction to human	Marine Life Science is an integrated study of how the oceans influence large and small scale patterns of marine biology through biophysical interactions. By studying the temperate cold waters of the NE Pacific Ocean, students will learn marine habitats as habitable planet, to appreciate the dynamics of marine biodiversity, the complex interactions between the physical and biological components, fishery, and the services the coastal oceans provide to human. This course will provide an excellent opportunity for students to experience the diversity of marine life of the Pacific.				
Course Contents & Topics	abundand The cour change in series of opportuni northern the Marin intertidal Marine bi will be ex teachers	Lectures from both HKU and UBC teachers will introduce 'marine life science'; with a focus on biodiversity, abundance and distribution of species, productivity, coastal pollution, fisheries, aquaculture and climate change. The course will also introduce the commercial aspects of marine life, i.e. eel-grass, aquaculture and climate change mitigation through management of coastal ecosystems. All these lectures will be discussed through a series of field observations, presentations from guest lecturers and group discussions. There will be an excellent opportunity to touch and learn about Canada's wonderful marine life diversity in the Vancouver Aquarium, and northern Vancouver Fish Hatchery. Students will be learning Canada's coastal plankton biodiversity through vising the Marina (Reed point marina) and the Sea-grass habitat. There will also be several opportunities to explore the intertidal zone, exposed and protected coastal habitats, sandy beaches and estuaries in the Vancouver Island. Marine biodiversity survey techniques and methods of studying marine life in the field will be emphasized. Students will be exposed to a different learning environment involving not only HKU teachers and students but also UBC teachers and students, bringing diverse range of expertise, cultures, and learning opportunities from both sides of				
Course Learning Outcomes	the Pacific Ocean to focus on the diversity, dynamic interactions and threats to marine life.  On successful completion of this course, students should be able to:  CLO 1 understand the basics of marine life science and the marine habitable planet  CLO 2 explain the major types, causes, and effects of marine threats such as pollution, overfishing, glob warming and ocean acidification, and invasive species, as well as describe the consequences of the threats for marine communities and ecosystem services  CLO 3 describe the difference between coastal marine biodiversity and harbors in Hong Kong and Canada					
Pre-requisites	th	e North Pacific coastal e	marine biodiversity and ecosyster cosystems assed at least 30 credits of level 1			
(and Co-requisites and Impermissible combinations)			order to be enrolled in the course.			
Offer in 2017 - 2018	N Off	fer in 2018 - 2019 : Y		Examination		
Grade Descriptors (A+ to F)	A Demonstrate through knowledge in basics of marine science and clearly understand why and how coastal biodiver tropical Hong Kong is different from the North Pacific coastal areas. Ability to explain how marine organisms have their particular environments. Showing strong abilities, and logical thinking, with evidence of original thought, to exami why the diversity of marine life and their habitats are so important to human society. Independent critique on how hum threats such as climate change, pollution and habitat change will affect marine life, its diversity and their ecosystem se Clear understanding of the basics of marine science. Ability to explain how marine organisms have adapted to their environments. Knowing the common views on the reasons why the diversity of marine life and their habitats are so in human society. Knowing the common views on how human induced threats such as climate change, pollution a			anisms have adapted to ight, to examine reasons e on how human induced ecosystem services. lapted to their particular oitats are so important to		
change will affect marine life, its diversity and their ecosystem services.  Demonstrate partial and limited command of knowledge and understanding of the basics of marine so coastal ecosystem services. Develop little ability to explain how marine organisms have adapted to their Knowing the common views on the reasons why the diversity of marine life and their habitats are so import Knowing the common views on how human induced threats such as climate change, pollution and he marine life, its diversity and their ecosystem services.				particular environments. ortant to human society.		
	D Fail	particular environments.	cs of marine science. Developing ability the science and/or how marine organism	<u> </u>	·	
Course Type	Field cam		<b> </b>	, ,		
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures		10 sessions x 2.5 hours		25	
	Field wor		Field observation and work: about	it 5 to 6 field study	36	
	Presenta		Group discussion / Project: presentation		10	
	Reading	/ Self study	F		70	
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents	Group project work (30-mins presentation)	25	CLO 2	

	Report	2-hour written examination	50	CLO 1,4
	Test	Field observation (group activities & reports)	25	CLO 3,4
Required/recommended reading and online materials	Reference reading materials will b	e put on Moodle.		
Course Website	http://www.scifac.hku.hk/news/bsc	:/ubc-summer-course		
Additional Course Information	(prices to be announced). This course will be offered subject Enrolment of this course is not	to a minimum enrollment number a conducted via the online course oval has been obtained from the co	and availability of teachers selection system. Studer	

SCNC3111	Frontier	Frontiers of science honours seminar course (6 credits)  Academic					
Offering Department	Faculty			Quota	120		
Course Co-ordinator	Dr R K W	Lui, Faculty (lui20	012@hku.hk)				
Teachers Involved	(Dr E K N	1 Leung & Dr E J P	Pickett,Faculty of Science)				
	(Dr G W Porter & Dr T D Wotherspoon, Faculty of Science)						
	,		Cheung,Faculty of Science)				
01: "		ors from different de	•				
Course Objectives			eing done by our Faculty's professors lents' scientific knowledge in and outside of th	air ahaaan majar			
			sions between our research professors and st				
			s done and note the thinking processes and pa		ic discoveries		
			eness of the importance of science to solve so				
			rn from peers from different academic backgro				
		•	n and spoken communication skills				
			ntor-mentee matching platform for faculty men	nbers and students			
		op an awareness o					
Course Contents			epartments will be featured in the honours so				
& Topics			its. The topics will span the areas of Biologi natics/Statistics & Actuarial science. In addition				
			nicating research will also be introduced: Int				
			Decoding a Scientific Paper and/or Effective C				
		er Presentations).	3				
Course Learning			of this course, students should be able to:				
Outcomes	CLO 1 d	lescribe and discus	ss in an informed manner the fields of researc	h of some of our resear	rch professors		
	CLO 2 ic	dentify how profess	sors with different scientific training solve their	research problems			
	CLO 3 a	pply literature sear	rch skills to identify and develop a research to	pic			
	CLO 4 practice and master scientific writing and presentation skills						
			ersonal skills in collaborating with their peers i	in a scientific setting			
			proposal and evaluate their peers' works				
Pre-requisites			1112 and a level 2 science course.				
(and Co-requisites	Students	who participated o	or will participate in ORF/SRF must take this c	ourse.			
and Impermissible							
combinations)							
Offer in 2017 2019	V 1ct	t com Offer in 20	10 2010 · V	Evamination	No Evam		
			18 - 2019 : Y	Examination	No Exam		
Grade Descriptors	Y 1st	Demonstrate thorou	18 - 2019 : Y gh mastery of extensive knowledge and skills required f d critical abilities and logical thinking, and ability to apply	or attaining all the course lea	arning outcomes. Sh		
	A	Demonstrate thorou strong analytical and situations. Apply hig	gh mastery of extensive knowledge and skills required f d critical abilities and logical thinking, and ability to apply hly effective organizational and presentational skills.	or attaining all the course leaknowledge to a wide range o	arning outcomes. Sl f familiar and unfam		
Grade Descriptors		Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substa	gh mastery of extensive knowledge and skills required f d critical abilities and logical thinking, and ability to apply Ihly effective organizational and presentational skills. antial command of a broad range of knowledge and skil	for attaining all the course leak knowledge to a wide range or Is required for attaining at le	arning outcomes. Sl f familiar and unfame east most of the cou		
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Grade Descriptors	A	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substat learning outcomes. Sand some unfamiliar Demonstrate generations.	gh mastery of extensive knowledge and skills required f d critical abilities and logical thinking, and ability to apply phly effective organizational and presentational skills. and command of a broad range of knowledge and skil Show evidence of analytical and critical abilities and logic r situations. Apply effective organizational and presentational but incomplete command of knowledge and skills r	or attaining all the course lead knowledge to a wide range of a staining at least thinking, and ability to apponal skills.	arning outcomes. SI f familiar and unfam east most of the cou ly knowledge to fam of the course learn		
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Grade Descriptors (A+ to F)  Course Type Course Teaching	B C D Fail Lecture-b Activities Lectures	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substate learning outcomes. Sand some unfamiliar Demonstrate genero outcomes. Show ever familiar situations. A Demonstrate partial Show evidence of sknowledge to solve Demonstrate little or of analytical and or problems. Organizations.	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lihly effective organizational and presentational skills. Intial command of a broad range of knowledge and skill Show evidence of analytical and critical abilities and logic r situations. Apply effective organizational and presentational but incomplete command of knowledge and skills ridence of some analytical and critical abilities and logic pply moderately effective organizational and presentation but limited command of knowledge and skills required to me coherent and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational r no evidence of command of knowledge and skills requiritical abilities, logical and coherent thinking. Show veition and presentational skills are minimally effective or income.	or attaining all the course leaknowledge to a wide range of a suide range of the course lead thinking, and ability to apponal skills. The course lead thinking, and ability to apponal skills. The course lead thinking, and ability to appal skills. The course lead thinking the course lead thinking the course lead the course lead to rattaining the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learner lea	arning outcomes. Siff amiliar and unfaminated with the couly knowledge to familiar and unfaminated with the course learning of the course learning outcome with limited ability to a community and the course learning outcomes. Learning outcome		
Grade Descriptors (A+ to F)  Course Type Course Teaching	B C D Fail Lecture-b Activitie: Lectures Tutorials	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substat learning outcomes. Sand some unfamiliar Demonstrate generoutcomes. Show ever familiar situations. A Demonstrate partial Show evidence of skinowledge to solve Demonstrate little or of analytical and criproblems. Organizations	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lihly effective organizational and presentational skills. Intial command of a broad range of knowledge and skill Show evidence of analytical and critical abilities and logic r situations. Apply effective organizational and presentational but incomplete command of knowledge and skills ridence of some analytical and critical abilities and logic pply moderately effective organizational and presentation but limited command of knowledge and skills required to me coherent and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational r no evidence of command of knowledge and skills requiritical abilities, logical and coherent thinking. Show veition and presentational skills are minimally effective or income.	or attaining all the course leaknowledge to a wide range of a suide range of the course lead thinking, and ability to apponal skills. The course lead thinking, and ability to apponal skills. The course lead thinking, and ability to appal skills. The course lead thinking the course lead thinking the course lead the course lead to rattaining the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learly little or no ability to applit the course learner lea	arning outcomes. Siff amiliar and unfaminated most of the couly knowledge to familiar and unfaminated most of the course learning outcome with a searning outcomes. Learning outcomes. L		
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Course Type Course Teaching & Learning Activities  Assessment Methods	B C D Fail Lecture-b Activitie: Lectures Tutorials	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substate learning outcomes. Sand some unfamiliar Demonstrate genero outcomes. Show ever familiar situations. A Demonstrate partial Show evidence of skinowledge to solve Demonstrate little or of analytical and cryproblems. Organizations.	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lihly effective organizational and presentational skills. Intial command of a broad range of knowledge and skill Show evidence of analytical and critical abilities and logic r situations. Apply effective organizational and presentational but incomplete command of knowledge and skills ridence of some analytical and critical abilities and logic pply moderately effective organizational and presentation but limited command of knowledge and skills required to me coherent and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational r no evidence of command of knowledge and skills requiritical abilities, logical and coherent thinking. Show veition and presentational skills are minimally effective or income.	or attaining all the course leaknowledge to a wide range of the seal thinking, and ability to apponal skills. The required for attaining most of the skills. The seal thinking, and ability to apponal skills. The seal thinking, and ability to appoin skills. The seal thinking, and ability to appoin skills. The seal thinking some of the course and presentational skills. The seal skills are seal to seal thinking the course learn seal thinking the seal thinking th	arning outcomes. S f familiar and unfan tast most of the couly knowledge to fan of the course learn ply knowledge to r arree learning outcom w limited ability to a tearning outcomes. It ly knowledge to so  No. of Hours 36 12 100  Assessmel		
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Course Type Course Teaching & Learning Activities  Assessment Methods	B C D Fail Lecture-b Activities Lectures Tutorials Reading	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substate learning outcomes. Sand some unfamiliar Demonstrate genero outcomes. Show ever familiar situations. A Demonstrate partial Show evidence of skinowledge to solve Demonstrate little or of analytical and cryproblems. Organizations.	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lithly effective organizational and presentational skills. antial command of a broad range of knowledge and skill Show evidence of analytical and critical abilities and logic r situations. Apply effective organizational and presentational but incomplete command of knowledge and skills ridence of some analytical and critical abilities and logic apply moderately effective organizational and presentation but limited command of knowledge and skills required to me coherent and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational r no evidence of command of knowledge and skills requiritical abilities, logical and coherent thinking. Show veition and presentational skills are minimally effective or incomplete.	or attaining all the course leaknowledge to a wide range of the seal thinking, and ability to apponal skills. The required for attaining most of the skills. The seal thinking, and ability to apponal skills. The seal thinking, and ability to appoin skills. The seal thinking, and ability to appoin skills. The seal thinking some of the course and presentational skills. The seal skills are seal to seal thinking the course learn seal thinking the seal thinking th	arning outcomes. S If familiar and unfam east most of the cou ly knowledge to fam of the course learn ply knowledge to n urse learning outcom w limited ability to a earning outcomes. L ly knowledge to so  No. of Hours 36 12 100  Assessmel Methods to CLO		
Course Type Course Teaching & Learning Activities  Assessment Methods	B C D Fail Lecture-b Activities Lectures Tutorials Reading Methods	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substate learning outcomes. Sand some unfamiliar Demonstrate generioutcomes. Show ever familiar situations. A Demonstrate port of sknowledge to solve Demonstrate little or of analytical and or problems. Organizations.	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lithly effective organizational and presentational skills. antial command of a broad range of knowledge and skill Show evidence of analytical and critical abilities and logic r situations. Apply effective organizational and presentational but incomplete command of knowledge and skills ridence of some analytical and critical abilities and logic apply moderately effective organizational and presentation but limited command of knowledge and skills required to me coherent and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational r no evidence of command of knowledge and skills requiritical abilities, logical and coherent thinking. Show veition and presentational skills are minimally effective or incomplete.	or attaining all the course leaknowledge to a wide range of list required for attaining at least thinking, and ability to apponal skills. The required for attaining most of all thinking, and ability to appal skills. The required for attaining some of the could and critical abilities. Show and presentational skills. The red for attaining the course leavy little or no ability to apple effective.  Weighting in final course grade (%)	arning outcomes. S f familiar and unfam tast most of the cou ly knowledge to fam of the course learn ply knowledge to n urse learning outcom w limited ability to a tarning outcomes. L ly knowledge to so  No. of Hours 36 12 100  Assessmel Methods to CLO Mapping		
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	B C D Fail Lecture-b Activities Lectures Tutorials Reading	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substate learning outcomes. Sand some unfamiliar Demonstrate generioutcomes. Show ever familiar situations. A Demonstrate port of sknowledge to solve Demonstrate little or of analytical and or problems. Organizations.	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lithly effective organizational and presentational skills. antial command of a broad range of knowledge and skills. Show evidence of analytical and critical abilities and logic restractions. Apply effective organizational and presentation at but incomplete command of knowledge and skills reidence of some analytical and critical abilities and logic apply moderately effective organizational and presentation but limited command of knowledge and skills required frome coherent and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational r no evidence of command of knowledge and skills requiritical abilities, logical and coherent thinking. Show ve tion and presentational skills are minimally effective or incommand of the command of knowledge and skills requirities and presentational skills are minimally effective or incommand of knowledge and skills required to the command of knowledge and skills required to the co	or attaining all the course leaknowledge to a wide range of the seal thinking, and ability to apponal skills. The required for attaining most of the skills. The seal thinking, and ability to apponal skills. The seal thinking, and ability to appoin skills. The seal thinking, and ability to appoin skills. The seal thinking some of the course and presentational skills. The seal skills are seal to seal thinking the course learn of the seal thinking the seal thin	arning outcomes. Sif familiar and unfaminate most of the couly knowledge to familiar and unfaminate most of the course learning outcome with limited ability to a parning outcome. Learning outcomes. Learn		
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Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	A B C D Fail Lecture-b Activities Lectures Tutorials Reading Methods	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substat learning outcomes. Sand some unfamiliar Demonstrate generic outcomes. Show ev familiar situations. A Demonstrate partial Show evidence of sk knowledge to solve Demonstrate little or of analytical and or problems. Organizations assed course s	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lityl effective organizational and presentational skills. antial command of a broad range of knowledge and skills how evidence of analytical and critical abilities and logic restractions. Apply effective organizational and presentation at but incomplete command of knowledge and skills ridence of some analytical and critical abilities and logic poply moderately effective organizational and presentation but limited command of knowledge and skills required fome coherent and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational rone evidence of command of knowledge and skills required rone vidence of command of knowledge and skills required titical abilities, logical and coherent thinking. Show vere tion and presentational skills are minimally effective or incommand presentational skills are minimally effective or incommand.  Details  Details  A series of writing and reflection assignments will be given  Students will give a 30-minute group presentation during the last week of the instruction	for attaining all the course leaknowledge to a wide range of lis required for attaining at least thinking, and ability to apponal skills. required for attaining most of earl thinking, and ability to appal skills. For attaining some of the course and presentational skills. For attaining the course lead to a training the course lead to	arning outcomes. Siff amiliar and unfaminate most of the couly knowledge to familiar and unfaminate most of the course learning outcome with limited ability to a most arning outcome. Let what it is a searning outcomes. Let when the course is a searning outcome. Let when the course is a searning outcomes. Let when the course is a searning outcome. Let when the course is a searning outcomes. Let when the course is a searning outcomes. Let when the course is a searning outcome. Let when the course is a searning		
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	A B C D Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignment	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substate learning outcomes. Sand some unfamiliar Demonstrate generoutcomes. Show evifamiliar situations. A Demonstrate partial Show evidence of sicknowledge to solve Demonstrate little or of analytical and or problems. Organizations assed course S	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lithly effective organizational and presentational skills. antial command of a broad range of knowledge and skills how evidence of analytical and critical abilities and logic restractions. Apply effective organizational and presentation at but incomplete command of knowledge and skills ridence of some analytical and critical abilities and logic pply moderately effective organizational and presentation but limited command of knowledge and skills required to the content and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational rone evidence of command of knowledge and skills required rone evidence of command of knowledge and skills required into abilities, logical and coherent thinking. Show vetion and presentational skills are minimally effective or incommender of the skills are minimally effective or incomme	for attaining all the course leaknowledge to a wide range of ls required for attaining at least thinking, and ability to apponal skills.  The required for attaining most of the course lead thinking, and ability to apponal skills.  The required for attaining most of the course lattinking some of the course lattinking some of the course and presentational skills.  The red for attaining the course leaved for attaining the course grade (%)  Weighting in final course grade (%)  40	arning outcomes. SI f familiar and unfam that most of the cou- ly knowledge to fam of the course learn ply knowledge to m urse learning outcom w limited ability to al earning outcomes. L ly knowledge to so  No. of Hours 36 12 100  Assessmen Methods to CLO Mapping CLO 1,2,4  CLO 3,4,5,		
Grade Descriptors (A+ to F)  Course Type Course Teaching & Learning Activities  Assessment Methods	A B C D Fail Lecture-b Activities Lectures Tutorials Reading Methods	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substate learning outcomes. Sand some unfamiliar Demonstrate generoutcomes. Show evifamiliar situations. A Demonstrate partial Show evidence of sicknowledge to solve Demonstrate little or of analytical and or problems. Organizations assed course S	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lithly effective organizational and presentational skills. antial command of a broad range of knowledge and skills how evidence of analytical and critical abilities and logic restraints and the straight of the command of knowledge and skills reduce of some analytical and critical abilities and logic ply moderately effective organizational and presentation but limited command of knowledge and skills required to the content and logical thinking, but with limited analyty problems. Apply limited or barely effective organizational ro evidence of command of knowledge and skills required rone vidence of command of knowledge and skills required into evidence of command of knowledge and skills required to evidence of command of knowledge and skills required to evidence of command of knowledge and skills required into and presentational skills are minimally effective or incommand presentational skills are minimally effective or incommand of knowledge and skills required in the strain and presentational skills are minimally effective or incommand presentation and pres	for attaining all the course leaknowledge to a wide range of lis required for attaining at least thinking, and ability to apponal skills. required for attaining most of earl thinking, and ability to appal skills. For attaining some of the course and presentational skills. For attaining the course lead to a training the course lead to	arning outcomes. Sif familiar and unfaminate most of the couly knowledge to familiar and unfaminate most of the course learning outcome with limited ability to a most of the course learning outcome with limited ability to a most outcome most outcome. Let when the course of the course outcome with limited ability to a most outcome with limited ability to a most outcome. Let when the course outcome with limited ability to a most outcome. Let when the course outcome with limited ability to a most outcome with limited ability to a most outcome. Let when the course outcome with limited ability outcomes. Let when the course outcome with limited ability outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes outcomes and the course outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes are considered as a second outcomes. Let when the course outcomes are considered as a second outcomes are considered as a sec		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	A B C D Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignment Presenta	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substate learning outcomes. I and some unfamiliar Demonstrate generoutcomes. Show ev familiar situations. A Demonstrate parial Show evidence of st knowledge to solve in Demonstrate little or of analytical and or problems. Organizations assed course s	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lithly effective organizational and presentational skills. antial command of a broad range of knowledge and skills. Show evidence of analytical and critical abilities and logic restraints and the strength of the command of knowledge and skills ridence of some analytical and critical abilities and logic ply moderately effective organizational and presentation but limited command of knowledge and skills required to the limited command of knowledge and skills required to the coherent and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational ro evidence of command of knowledge and skills required to the command of knowledge and skills required to evidence of command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command presentational skills are minimally effective or incommand presentation and presentation discommand presentation dis	for attaining all the course leaknowledge to a wide range of ls required for attaining at least thinking, and ability to apponal skills.  The required for attaining most of the course lead thinking, and ability to apponal skills.  The required for attaining most of the course lattinking some of the course lattinking some of the course and presentational skills.  The red for attaining the course leaved for attaining the course grade (%)  Weighting in final course grade (%)  40	arning outcomes. SI f familiar and unfam that most of the cou- ly knowledge to fam of the course learn ply knowledge to m the course learn the course l		
Course Type Course Teaching Learning Activities  Assessment Methods	A B C D Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignment Presenta	Demonstrate thorou strong analytical and situations. Apply hig Demonstrate substate learning outcomes. Sand some unfamiliar Demonstrate generoutcomes. Show evifamiliar situations. A Demonstrate partial Show evidence of sicknowledge to solve Demonstrate little or of analytical and or problems. Organizations assed course S	gh mastery of extensive knowledge and skills required for critical abilities and logical thinking, and ability to apply lithly effective organizational and presentational skills. antial command of a broad range of knowledge and skills. Show evidence of analytical and critical abilities and logic restraints and the strength of the command of knowledge and skills ridence of some analytical and critical abilities and logic ply moderately effective organizational and presentation but limited command of knowledge and skills required to the limited command of knowledge and skills required to the coherent and logical thinking, but with limited analyt problems. Apply limited or barely effective organizational ro evidence of command of knowledge and skills required to the command of knowledge and skills required to evidence of command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command presentational skills are minimally effective or incommand presentation and presentation discommand presentation dis	for attaining all the course leaknowledge to a wide range of ls required for attaining at least thinking, and ability to apponal skills.  The required for attaining most of the course lead thinking, and ability to apponal skills.  The required for attaining most of the course lattinking some of the course lattinking some of the course and presentational skills.  The red for attaining the course leaved for attaining the course grade (%)  Weighting in final course grade (%)  40	arning outcomes. S If familiar and unfam east most of the cou ly knowledge to fam of the course learn ply knowledge to no urse learning outcome w limited ability to a earning outcomes. L ly knowledge to so  No. of Hours 36 12 100 Assessmel Methods to CLO Mapping CLO 1,2,4		

STAT1600	Statistic	s: ideas and concep	ots (6 credits)	Academic Year	2017	
Offering Department	Statistics 8	& Actuarial Science		Quota		
Course Co-ordinator	Dr Y K Ch	ung, Statistics & Actuari	al Science (yukchung@hku.hk)			
Teachers Involved	`	i,Statistics & Actuarial S nung,Statistics & Actuari	,			
Course Objectives	Manageme disciplines	The course aims at providing a broad overview of statistics for students who aspire to major in Statistics or Risk Management. It focuses on the roles of statistics as a scientific tool with applications to a wide spectrum of disciplines, and as a science of reasoning which has revolutionized modern intellectual endeavours. It lays a panoramic foundation for a formal study of statistics at the university level.				
Course Contents & Topics	- Data coll - Data pres - Probabili - Inference	- Data collection: observational studies versus designed experiments - Data presentation: tables; graphs; frequency distributions; correlations; trends - Probability: randomness; probability models; distributions; measures of central tendency and dispersion - Inference: estimation; tests of significance and hypotheses; confidence intervals; regression; prediction - Further issues: controversies; misuse of statistics; ethics.				
Course Learning Outcomes	CLO 1 ur CLO 2 pr CLO 3 ac	On successful completion of this course, students should be able to:  CLO 1 understand the role of statistics as a tool for scientific reasoning  CLO 2 present data in a useful and informative way  CLO 3 acquire basic concepts and perspectives of statistical modelling and inference				
			and bad statistical practices	wall astablished aspentus	l foundation	
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL NIL	CLO 5 pursue a major study in Statistics or Risk Management with a well-established conceptual foundation  NIL				
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offer i	n 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	В	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	C D	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.				
	Fail	knowledge to solve problems  Demonstrate little or no evid of analytical and critical ab	erent and logical thinking, but with limited ans. Apply limited or barely effective organizatio ence of command of knowledge and skills re ilities, logical and coherent thinking. Show presentational skills are minimally effective or	nal and presentational skills. quired for attaining the course lea very little or no ability to apply	arning outcomes. Lack	
Course Type	Lecture-ha	sed course	presentational skills are minimally effective of	menecuve.		
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
· ·	Tutorials				12	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts	Coursework (assignments, class test(s) and project(s))	60	CLO 1,2,3,4,5	
	Examinati		One 2-hour written examination	40	CLO 1,2,3,4,5	
Required/recommended reading and online materials	Heckard, F Albright, S Cengage I	R.F. and Utts, J.M. (2012 c. C., Winston, W. L. and Learning.	Statistics (4th edition). Cengage Lea 2). Statistics (International edition, 4 d Zappe, C. J. (2009). Data Analysis 3). Statistics: Concepts and Controve	th edition). Cengage Learn s and Decision Making wit	h Microsoft Excel.	
		, , ,	,			

STAT1601	Elementary statistical methods (6 credits)	Academic Year	2017		
Offering Department	Statistics & Actuarial Science	Quota			
Course Co-ordinator	TBC, Statistics & Actuarial Science ()				
Teachers Involved					
Course Objectives	Research findings are usually supported by data. Data collected in an experiment/survey are often concerned with situations involving variability and uncertainty. They are used to estimate the true value of a certain quantity or to test the acceptability of a certain new hypothesis. Valid methods of analysing the data are thus essential to any successful investigation. The course aims to present the fundamentals of statistical methods widely used by researchers. Microsoft Excel might be used to carry out some statistical analysis. There is no demand of sophisticated technical mathematics.				
Course Contents & Topics	The course will introduce and study the following topics:  Presentation of data, Measures of Central Tendency, Measures of Variability and Uncertainty, Basic Probability Laws, Common Probability Distributions such as Uniform, Binomial, Poisson, Hyper-geometric, Geometric and Normal distributions, Random Sampling, Distribution of the Mean, Normal Sampling Theorem, Point Estimation, Confidence Intervals, Sample Size Determination, Hypothesis Testing, Inferences for Mean and Proportion, Chi				
Course Learning Outcomes	squared tests, Simple Regression and Correlation  On successful completion of this course, students should be able to:  CLO 1 select and use appropriate statistical methods to analyze data  CLO 2 perform statistical analysis with calculator and Microsoft Excel  CLO 3 understand and apply basic concepts of probability  CLO 4 gain familiarity with the fundamental concepts of random variables  CLO 5 make inferences on a population based on sample data  CLO 6 determine the most appropriate statistical method to use for a given statistical problem				

	CLO 7 w	CLO 7 write appropriate conclusions based on the statistical results					
		CLO 8 understand the basic principles of simple linear regression and correlation and their applications to practical problems					
Pre-requisites	Level 2 o	r above in HKDSE Math	ematics or equivalent; and				
and Co-requisites	Not for st	Not for students with Level 2 or above in HKDSE Mathematics Extended Module 1 or 2; and					
and Impermissible	Not for s	tudents who have pass	ed or already enrolled in any of the	e following courses: STA	AT2901, STAT1602,		
combinations)	STAT260	)1, STAT1603, ECON12	80				
Offer in 2017 - 2018	N Of	fer in 2018 - 2019 : Y		Examination			
Grade Descriptors (A+ to F)	Α	learning outcomes. Show s	stery at an advanced level of extensive kno strong analytical and critical abilities and logic vide range of complex, familiar and unfamili	al thinking, with evidence of ori	iginal thought, and ability		
	В	learning outcomes. Show e	ommand of a broad range of knowledge and vidence of analytical and critical abilities and I ons. Apply effective organizational and presen	ogical thinking, and ability to ap			
	С	Demonstrate general but outcomes. Show evidence	incomplete command of knowledge and ski of some analytical and critical abilities and I oderately effective organizational and present	lls required for attaining most ogical thinking, and ability to a			
	D						
	Fail						
Course Type	Lecture-b	pased course	,				
Course Teaching	Activitie	s	Details	No. of Hours			
& Learning Activities	Lectures				36		
_	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework (assignments,		0.0400450		
	Assignm	ents	tutorials, and a class test)	25	CLO 1,2,3,4,5,6		
	Assignm			25 75	CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6,7,8		
reading and	Examina Chiu W. I Larson, F Berk, K.N	ntion K.: Basic Statistics (Pear R. & Farber, B.: Element J. & Carey, P.: Data Ana	tutorials, and a class test)  One 2-hour written examination	75 entice Hall, 2008, 4th ed. press, Update Office 200	CLO 1,2,3,4,5,6,7,8		
Required/recommended reading and online materials Course Website	Examina Chiu W. I Larson, F Berk, K.N	ntion K.: Basic Statistics (Pear R. & Farber, B.: Elemente J. & Carey, P.: Data Ana J. E. & Perles, B. M.: Sta	tutorials, and a class test)  One 2-hour written examination  rson (Asia), 2007)  ary Statistics, Picturing the World (Prilysis with Microsoft EXCEL (Duxbury	75 entice Hall, 2008, 4th ed. press, Update Office 200	CLO 1,2,3,4,5,6,7,8		
reading and online materials	Examina Chiu W. I Larson, F Berk, K.N Freund, C moodle.h	ntion K.: Basic Statistics (Pear R. & Farber, B.: Elementa J. & Carey, P.: Data Ana J. E. & Perles, B. M.: Sta lku.hk	tutorials, and a class test)  One 2-hour written examination  rson (Asia), 2007)  ary Statistics, Picturing the World (Prilysis with Microsoft EXCEL (Duxbury	75 entice Hall, 2008, 4th ed. press, Update Office 200, 2004, 8th ed.)	CLO 1,2,3,4,5,6,7,8		

STAT1602	Business	s statistics (6 c	redits)			Academic Year	2017
Offering Department	Statistics 8	& Actuarial Science	•			Quota	
Course Co-ordinator	Dr R W L V	Dr R W L Wong, Statistics & Actuarial Science (rwong@hku.hk)					
Teachers Involved		Wong, Statistics &			,		
Course Objectives	affects the elementary analysis a	The discipline of statistics is concerned with situations involving uncertainty and variability. Variability greatly affects the interpretation of data. Thus statistics forms an important descriptive and analytical tool. This elementary course, which is taught without much technical mathematics, presents many standard situations of data analysis and interpretation with emphases on business examples. The statistical tests of these situations are presented. Microsoft Excel might be used to carry out some statistical analysis.					
Course Contents & Topics	The course Measures Binomial, N Point Estin	The course will introduce and discuss the following topics: Presentation of Data, Measures of Central Tendency, Measures of Variability and Uncertainty, Elementary Probability Rules and Basic Probability Distributions such as Binomial, Normal, Poisson, Hyper-geometric and Geometric, Random Sampling, the Normal Sampling Theorem. Point Estimation, Confidence Intervals and Sample Size Determination, Hypothesis Testing involving Inferences for Means and Proportions as well as the Chi-square tests, Simple Regression and Correlation, Elementary Time					
Course Learning	On succes	sful completion of	this course, stu	idents should b	e able to:		
Outcomes	CLO 1 und	derstand the meth	ods for describ	ing sets of data			
	CLO 2 perform statistical analysis with calculator and Microsoft Excel, draw conclusions from data using numerical summaries						
	CLO 3 und	derstand and appl	y basic concep	ts of probability			
	CLO 4 gain familiarity with the fundamental concepts of random variables						
	CLO 5 make inferences on a population based on sample data						
	CLO 6 determine the most appropriate statistical method to use for a given statistical problem						
	CLO 7 gain familiarity with the fundamental concepts of statistical inference as they apply to a variety of problems						
	CLO 8 uno	derstand the bas	ic principles o	f simple linear	regression and cor	, ,,,	, ,
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL Not for stu STAT1603	practical problems in today's society  NIL  Not for students who have passed or already enrolled in any of the following courses: STAT1601, STAT2601 STAT1603, STAT2901, ECON1280  (This course is exclusive for School of Business students.)					
Offer in 2017 - 2018		sem 2nd sem				Examination	Dec May
Grade Descriptors (A+ to F)	A	learning outcomes. S	how strong analyti	cal and critical abil	extensive knowledge and ties and logical thinking, v and unfamiliar situations	vith evidence of origina	aining all the course al thought, and abilit
	В	learning outcomes. S	how evidence of ar	nalytical and critical	owledge and skills requir abilities and logical thinkinal al and presentational skill	ng, and ability to apply	
	С				edge and skills required abilities and logical thinki		

		familiar situations. Apply n	noderately effective organizational and present	tational skills.			
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcom Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to ap knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no ev of analytical and critical problems. Organization an					
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4		
	Examination		One 2-hour written examination	75	CLO 1,2,3,4,5,6,7,8		
Required/recommended reading and online materials	Freund, J. Berk, K.N.	E. & Perles, B. M.: Mo & Carey, P.: Data Ana	ics (Cengage Learning, 2009, 8th ed odern Elementary Statistics (Prentice alysis with Microsoft EXCEL (Duxbury S.: Business Statistics in Practice (M	Hall, 2006, 12th ed.) y press, Update Office 20			
Course Website	moodle.hk		(4.1.		, , ,		

STAT1603	Introdu	ctory statistics	(6 credits)	Academic Ye	ar 2017	
Offering Department	Statistics	& Actuarial Science	•	Quota		
Course Co-ordinator	Dr E K F	Lam, Statistics & A	ctuarial Science (hrntlkf@hku.hk)			
Teachers Involved	,	Lam, Statistics & A	•			
		(Mrs G Jing, Statistics & Actuarial Science)				
Course Objectives	data need descriptive this cours	The discipline of statistics is concerned with situations involving uncertainty and variability. The interpretation of data needs special techniques when variability plays a role, as it usually does. Thus statistics forms an important descriptive and analytical tool of many scientific disciplines. Candidates with a mathematical background will fine this course suitable, because the language of mathematics allows the subject of statistics to be presented with economy and clarity.				
Course Contents & Topics	Probabilit Estimatio	Presentation of data, Variability and Uncertainty, Measures of Central Tendency, Measures of Dispersion, Basic Probability Theory and Techniques, Random Variables and Probability Distributions, Random Samples, Point Estimation, Normal Sampling Theorem, Confidence Intervals, Hypotheses Testing, Simple Linear Regression and Correlation.				
Course Learning	On succe	ssful completion of	this course, students should be able to:			
Outcomes	CLO 1 co	ompute different me	easures of central tendency and dispersion	n		
			c probability theory and techniques to sol			
	p	opulation	uct confidence intervals and use hypotl			
	е	nvironment	n and correlation methods to solve prob		ocial and business	
Pre-requisites			Mathematics Extended Module 1 or 2 or			
(and Co-requisites and Impermissible combinations)	(Pass in MATH1009 Basic mathematics for business and economics or MATH1011 or MATH1013, or alreat enrolled in these courses); and  Not for students who have passed or already enrolled in any of these courses: STAT1601, STAT1602, STAT26  STAT2901					
Offer in 2017 - 2018	Y 1st	t sem 2nd sem	Offer in 2018 - 2019 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	A	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D					
	Fail					
Course Type	Lecture-b	ased course	,			
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials					
	Reading	/ Self study				
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3	
	Examina	tion	One 2-hour written examination	75	CLO 1,2,3,4	
Required/recommender reading and online materials	2004, 7th Larson, R	edition) R. and Farber, B.: E	n E. Freund's Mathematical Statistics w lementary Statistics - Picturing the World Statistics - A Step by Step Approach (1	(Prentice Hall, 2006, 3rd	edition)	

	edition) Triola, M. F.: Elementary Statistics (Addison-Wesley Longman, Inc., 1998, 7th edition)
Course Website	moodle.hku.hk
Additional Course Information	Students who intend to major in "Decision Analytics" or "Risk Management" or "Statistics" should take STAT2601 instead of this course.  Other references:
	Wonnacott, T. H. and Wonnacott, R. J.: Introductory Statistics (Wiley, New York, 1972, 2nd edition) Dixon, W. J. and Massey, Jr, F. J.: Introduction to Statistical Analysis (McGraw Hill, 1983, 4th edition)

STAT2601	Probabil	ity and statistics I (6	6 credits)	Academic Yea	r 2017		
Offering Department	Statistics 8	& Actuarial Science		Quota			
Course Co-ordinator	Dr K P Wa	t, Statistics & Actuarial S	Science (watkp@hku.hk)				
Teachers Involved	(Dr K P Wa	Dr K P Wat,Statistics & Actuarial Science)					
Course Objectives  Course Contents	forms an in problems t	The discipline of statistics is concerned with situations in which uncertainty and variability play an essential role and forms an important descriptive and analytical tool in many practical problems. Against a background of motivating problems this course develops relevant probability models for the description of such uncertainty and variability.					
& Topics	Discrete ribinomial, g Probability Joint distri	Sample spaces; Operations of events; Probability and probability laws; Conditional probability; Independence; Discrete random variables; Cumulative distribution function (cdf); Probability mass function (pmf); Bernoulli, binomial, geometric, and Poisson distributions; Continuous random variables; Cumulative distribution function (cdf); Probability density function (pdf); Exponential, Gamma, and normal distributions; Functions of a random variable; Joint distributions; Marginal distributions; Independent random variables; Functions of jointly distributed random variables; Expected value; Variance and standard deviation; Covariance and correlation.					
Course Learning	On succes	sful completion of this c	ourse, students should be able to:				
Outcomes	CLO 1	understand the basic	concepts in probability theory				
	CLO 2	gain some insights to	statistics and inference				
	CLO 3	solve real-world prob	lem by using probability calculation	IS			
	CLO 4	pursue their further s	tudies in statistics				
Pre-requisites	Pass or a	already enrolled in MA	TH2014, or (MATH2101 and MA	TH2211), for students adr	nitted in 2014 or		
(and Co-requisites and Impermissible combinations)	thereafter; Pass in MA Pass in MA Not for stu Not for stu	Pass in MATH1013, or already enrolled in this course, for students admitted in 2013 or before; or Pass in MATH1851 and MATH1853, for students admitted in 2013 or before; and Not for students who have passed in STAT1603, or already enrolled in this course; Not for students who have passed in STAT2901, or already enrolled in this course; and Not for BSc(ActuarSc) students.					
Offer in 2017 - 2018	Y 1st	sem 2nd sem Offer i	n 2018 - 2019 : Y	Examination	Dec May		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lat of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solv problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type		ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme		Coursework (assignments, tutorials, and class test(s))	25	CLO 1,2,3		
	Examination		One 2-hour written examination	75	CLO 1,2,3		
Required/recommended reading and online materials	Ross, S.M Miller, I. a Prentice H Hogg, R.V Prentice H	DeGroot, M.H. and Schervish, M.J. (2014). Probability and Statistics (4th edition). Boston: Addison-Wesley. Ross, S.M. (2014). A First Course in Probability (9th edition). Upper Saddle River: Prentice Hall. Miller, I. and Miller, M. (2014). John E. Freund's Mathematical Statistics with Applications (8th edition). Boston: Prentice Hall. Hogg, R.V., McKean J.W., and Craig, A.T. (2013). Introduction to Mathematical Statistics (7th edition). Boston: Prentice Hall. Hogg, R. V. & Tanis E. A. and Zimmerman, D.L. (2015). Probability and Statistical Inference (9th edition). Boston:					
	Dooroon			•	*		
Course Website	Pearson. moodle.hk	u.hk					

STAT2602	Probability and statistics II (6 credits)	Academic Year	2017			
Offering Department	Statistics & Actuarial Science	Quota				
Course Co-ordinator	Dr K Zhu, Statistics & Actuarial Science (mazhuke@hku.hk)					
Teachers Involved	(Dr K Zhu, Statistics & Actuarial Science)					
Course Objectives	This course builds on STAT2601, introducing further the concepts and methods of statistics. Emphasis is on the two major areas of statistical analysis: estimation and hypothesis testing. Through the disciplines of statistical modelling, inference and decision making, students will be equipped with both quantitative skills and qualitative perceptions essential for making rigorous statistical analysis of real-life data.					
Course Contents	Overview: random sample; sampling distributions of statistics; moment gener	ating function; larg	e-sample theory:			

& Topics	laws of large numbers and Central Limit Theorem; likelihood; sufficiency; factorisation criterion;  2. Estimation: estimator; bias; mean squared error; standard error; consistency; Fisher information; Cramer-Rabower Bound; efficiency; method of moments; maximum likelihood estimator;							
	3. Hypotl	hesis testing: types of h	nypotheses; test statistics; p-value	e; size; power; likelihood	ratio test; Neyman			
		, <b>G</b>	ihood ratio test; Pearson chi-squar e level; confidence limits; equal-tai		pased on hypothesis			
Course Learning		successful completion of this course, students should be able to:						
Outcomes			of statistics and its relation to prob					
	CLO 2	elate a real-life problem	to a formal framework for statistica	l inference				
			etric statistical inference by means	, i	sis testing			
	CLO 4	eckon the general applic	ability of statistics in a broad range	of subject areas				
Pre-requisites (and Co-requisites and Impermissible combinations)		ass in STAT2601; and ot for students who have passed in STAT3902, or already enrolled in this course.						
Offer in 2017 - 2018	Y 2n	d sem Offer in 2018 - 2	019 : Y	Examination	May			
Grade Descriptors (A+ to F)	Α	learning outcomes. Show st	tery at an advanced level of extensive kr rong analytical and critical abilities and log ide range of complex, familiar and unfam	ical thinking, with evidence of or	iginal thought, and ability			
	В							
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D							
	Fail	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-b	ased course	· · · · · · · · · · · · · · · · · · ·					
Course Teaching	Activitie	s	Details		No. of Hours			
& Learning Activities	Lectures			36				
	Tutorials			12				
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods	<b>S</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm	ents	Coursework (assignments, tutorials and a class test)	25	CLO 1,2,3,4			
	Examina	tion	One 2-hour written examination	75	CLO 1,2,3,4			
Required/recommended reading and online materials	Bickel, P. Saddle R Hogg, R.	Berry, D.A. & Lindgren, B.W. (1996). Statistics: Theory and Methods. Duxbury: Belmont. Bickel, P.J. & Doksum, K.A. (2001). Mathematical Statistics: Basic Ideas and Selected Topics. Prentice Hall: Upper Saddle River, N.J. Hogg, R.V. & Craig, A.T. (1989). Introduction to Mathematical Statistics. Macmillan: New York. Miller, I. & Miller, M. (2004). John E. Freund's Mathematical Statistics with Applications. Pearson Prentice Hall:						

STAT2603	Data ma	nagement with SAS (6 credits)	Academic Year	2017				
Offering Department	Statistics 8	Actuarial Science	Quota	50				
Course Co-ordinator	Dr G C S L	Dr G C S Lui, Statistics & Actuarial Science (csglui@hku.hk)						
Teachers Involved	(Dr G C S	Lui,Statistics & Actuarial Science)						
Course Objectives	elementary different da	This course is designed for students who want to learn the statistical software (SAS) for data management and elementary data analysis. This course focuses on using SAS to manage data set input and output, work with different data types, manipulate and transform data, perform random sampling and descriptive data analysis, and create summary reports and graphics.						
Course Contents & Topics	topics, in manipulation	Data management system for statistical projects. Data validation and cleaning techniques. SAS programming topics, including the following: Data set input and output. Working with different data types. Data manipulation. Data transformation. File manipulation. File management. Data reporting, summarization, presentation and graphics. Basic data analysis. Structured query language.						
Course Learning	On succes	sful completion of this course, students should be able to:						
Outcomes	CLO 1 access online help and document							
	CLO 2 use Data Step to create data files							
	CLO 3 summarize data by PROC MEANS, PROC FREQ, and PROC UNIVARIATE							
	CLO 4 work with numeric, character, and date variables and functions in Data Step							
	CLO 5 perform conditional processing in Data Step							
	SA PF	form iterative processing in Data Step including the followin S data sets by Data Step and PROC TRANSPOSE; subs OC APPEND; present data in a readable way by PROC TA PROC SGPLOT, HTML output by ODS; procedure SQL for s	et and merge data sets b ABULATE; produce high-re	y Data Step and esolution graphics				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT1600 or MATH1821, or already enrolled in this course							
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2019 : Y	Examination	Dec				
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logica to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.	I thinking, with evidence of origin	nal thought, and ability				

	В	learning outcomes. Show evi	nmand of a broad range of knowledge and idence of analytical and critical abilities and ns. Apply effective organizational and preser	logical thinking, and ability to ap			
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	of analytical and critical ab	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcome of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to problems. Organization and presentational skills are minimally effective or ineffective.				
Course Type	Lecture-ba	sed course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials			12			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework (assignments, tutorials, and class test(s))	40	CLO 1,2,3,4,5,6		
	Examination	on	One 2-hour written examination	60	CLO 1,2,3,4,5,6		
reading and online materials	Cody, R.P.: Learning SAS by Example: A Programmer's Guide (North Carolina: SAS Institute Inc., 2007) SAS: SAS Certification Prep Guide: Base Programming for SAS 9. Third Edition. (SAS Institute Inc., 2011) Bailer, J.: Statistical Programming in SAS. North Carolina: (SAS Institute Inc., 2010) Delwiche, L. and Slaughter, S.: The Little SAS Book: A Primer. Fifth Edition. (SAS Institute Inc, 2012) Cody, R. P.: Cody's Data Cleaning Techniques Using SAS System (North Carolina: SAS Institute, 2008, 2nd edition) SAS: Step by Step Programming with Base SAS Software (North Carolina: SAS Publishing, 2001)						
	moodle.hk	, , ,	, , , , , ,	<b>3</b> , -			

STAT2605	Demog	graphic and socio-ed	conomic statistics (6 credits)	Academic Yo	ear 2017			
Offering Department	Statistics	s & Actuarial Science	•	Quota				
Course Co-ordinator	Ms L M	S Kwan, Statistics & Acti	uarial Science (lucykwan@hku.hk)					
Teachers Involved	(Ms L M	S Kwan, Statistics & Act	uarial Science)					
Course Objectives	The cou	irse covers the major n	nethods for studying demographic a	and socio-economic stati	stics, which provide			
	students indicator	quantitative information on the essential aspects of the lives of citizens in a territory. The course aims to provide students with 1) essential knowledge including the underlying principles of the pertinent methods and statistical indicators; and 2) skills in the statistical descriptions of a territory and their interpretation and application to planning, policy-making and commercial endeavours.						
Course Contents & Topics	Populati	on structure, fertility, mo	rtality, migration, life tables, populationg, labour, and social equity;	n projections;				
		ic statistics on prices and						
	Sources	theory and methods of	official statistics;					
	Example	es would be especially dr	awn from Hong Kong, and Mainland	China.				
Course Learning	On succ	essful completion of this	course, students should be able to:					
Outcomes	CLO 1	describe and interpret ma	ajor official & other publicly dissemina	ated socio-economic stati	stics of a territory			
		further appraise and ana Kong and mainland Chin	lyse the socio-economic well-being of	of a territory with particula	ar reference to Hon			
	CLO 3	predict a future situation	by assimilating and deriving from app	propriate statistics				
	CLO 4	critically assess statistics	reporting					
Pre-requisites (and Co-requisites and Impermissible combinations)	equivale Pass or	(Level 2 or above in HKDSE Mathematics or Level 2 or above in HKDSE Mathematics Extended Module 1 or 2 or equivalent); and Pass or already enrolled in BIOL2102, ECON1280, STAT1601, STAT1602, STAT2601, STAT1603, STAT2901						
Offer in 2017 - 2018	Y 2r	nd sem Offer in 2018 -		Examination				
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.							
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.							
	D							
	Fail	Demonstrate little or no ev of analytical and critical	vidence of command of knowledge and skills nabilities, logical and coherent thinking. Showld presentational skills are minimally effective of	equired for attaining the course v very little or no ability to a				
Course Type	Lecture-	based course	·					
	Activitie	es	Details	No. of Hours				
Course Teaching	Lectures			36				
	Tutorials							
		S			12			
	Tutorials	s g / Self study			12 100			
& Learning Activities  Assessment Methods	Tutorials	g / Self study	Details	Weighting in final course grade (%)				
Course Teaching & Learning Activities  Assessment Methods and Weighting	Tutorials Reading	g / Self study Is	Details  Coursework (assignments, tutorials and a test)	0 0	100 Assessment Methods			

Required/recommended	Annual Digest of Statistics (Census & Statistics Department, Hong Kong SAR, latest issue)
reading and	Pollard A. H., Yusuf F., & Pollard G. N.: Demographic Techniques (Pergamon Press, 1990, 3rd edition)
online materials	Giovannini E.: Understanding Economic Statistics - an OECD Perspective (OECD, 2008)
Course Website	moodle.hku.hk

STAT2901	Probabil credits)	ity and statistics: f	oundations of actuarial scien	cademic Year	2017		
Offering Department	Statistics 8	& Actuarial Science		Q	uota		
Course Co-ordinator			ial Science (cwkwan@hku.hk)				
Teachers Involved		wan,Statistics & Actuar	•				
Course Objectives	quantitativ	ely assessing risk. Ap	o develop knowledge of the funda oplications of these tools to actua nmand of probability topics and the	arial science	problems will		
Course Contents & Topics	- Mutually - Addition - Independ - Combina - Conditior - Bayes Tr - Random 2. Univaria uniform, e distributior - Probabili - Cumulati - Mode, m - Variance - Central L	Basic elements of probability in set notation  Mutually exclusive events  Addition and multiplication rules Independence of events Combinatorial probability Conditional probability and expectations Bayes Theorem / Law of total probability Random variables 2. Univariate probability distributions (including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, chi-square, beta, Pareto, lognormal, gamma, Weibull and normal) and bivariate normal distribution Probability functions and probability density functions Cumulative distribution functions Mode, median, percentiles and moments Variance and measures of dispersion Central Limit Theorem 3. Sampling distributions and introduction of estimation					
Course Learning			course, students should be able to:				
Outcomes				nractice of s	tatietice		
Outcomes	CLO 1 understand the mathematical theory underlying the modern practice of statistics CLO 2 develop skills in probabilistic analysis for problems involving randomness						
				•			
			bability and statistics to solve actual				
Pre-requisites (and Co-requisites and Impermissible	Pass in Ma	ATH1013 or already en udents who have pas	arSc) students] or already enrolled i rolled in this course [for students ou sed or enrolled in any of these c	tside the BSc	(ActuarSc) pro		
combinations) Offer in 2017 - 2018			2010 · V		vamination	Mov	
	A 2110				xamination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar						
	and some unfamiliar situations. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
Course Type	Fail   Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.    Lecture-based course   Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical shills required for attaining the course learning outcomes. Lack of analytical and critical shills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and scheme for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type Course Teaching			Details			No. of Hours	
Sourse reaching  Learning Activities	Activities		Details				
- Louining Activities	Lectures		tutorials/ovample alasses			36 12	
	Tutorials	Self study	tutorials/example classes			100	
Accomment Mathed-	1	Jeli Study	Deteile	\A/-:	an in fire el		
Assessment Methods and Weighting	Methods		Details		ng in final grade (%)	Assessment Methods to CLO Mappin	
	Assignments		Coursework (assignments,	2	25	CLO 1,2,3	
			tutorials, and a class test)	<u> </u>	75		
Required/recommended reading and online materials	Feller, W. Hassett, M Hogg RV & Sheldon R Wackerly	Examination  One 3-hour written examination  75  CLO 1,2,3  Feller, W. (1968). An Introduction to Probability Theory and Its Applications. Wiley, New York.  Hassett, M. and Stewart, D. (2006) Probability for Risk Management (2nd Edition). ACTEX Publication: Winsted.  Hogg RV & Tanis EA (2009). Probability and Statistical Inference (8th Edition). Prentice Hall: Upper Saddle River.  Sheldon R (2005). A First Course in Probability (7th Edition). Prentice Hall: Upper Saddle River.  Wackerly D, Mendenhall R and Scheaffer R (2008). Mathematical Statistics with Applications. (7th Edition).  Thomson Brooks/Cole: California.					
Course Website	moodle.hk						

STAT2902	Financial mathematics (6 credits)	Academic Year	2017			
Offering Department	Statistics & Actuarial Science Quota					
Course Co-ordinator	Prof K C Yuen, Statistics & Actuarial Science (kcyuen@hku.hk)					
Teachers Involved	(Prof K C Yuen, Statistics & Actuarial Science)					
Course Objectives	This course introduces the fundamental concepts of financial mathematics which plays an important role in the development of basic actuarial techniques. Practical applications of these concepts are also covered.					

Course Contents & Topics	Key topics include: measurement of interest, annuities certain; discounted cash flow analysis; yield rates; amortization schedules and sinking funds; bonds and related securities; practical applications such as real estate mortgage and short sales; stochastic approaches to interest; and key terms of financial analysis such as yield curves, spot rates, forward rates, duration, convexity, and immunization.					
Course Learning			course, students should be able to:			
Outcomes			tal concepts of financial mathematics			
			otations for a variety of annuities			
			nflow analysis using basic annuities			
		•	ome commonly-encountered financi	al instruments such as	bonds, mortgages,	
		ort sales, and so on	and a and datarmina intercat rate ba	and an a series of finance	al transactions	
			nodes and determine interest rate bas	sed on a series of linanc	iai transactions	
Dra raquiaitas		eal with Exam FM of the	rolled in this course; and			
Pre-requisites (and Co-requisites		,	l in STAT3615, or already enrolled in	thic course		
and Impermissible	NOT 101 SIL	idents who have passed	Till STA 13013, or already efficiled in	tilis course.		
combinations)						
Offer in 2017 - 2018	Y 2nd	l sem Offer in 2018 - 2	019 : Y	Examination	May	
Grade Descriptors	Α		tery at an advanced level of extensive know			
(A+ to F)		learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials		tutorials/example classes		12	
	Reading	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Coursework (assignments, tutorials, and class test(s))	25	CLO 1,2,3,4,5,6	
	Examinat	ion	One 3-hour written examination	75	CLO 1,2,3,4,5,6	
Required/recommended	Kellison, S	S. G.: The Theory of Inte	rest (Irwin: Illinois, 2008, 3rd edition)			
reading and online materials	Broverma 2004, 3rd		of Investment and Credit (ACTEX Pu	ublications - Mad River	Books: Connecticut,	
Course Website	moodle.hl	ku.hk				

STAT3600	Linear sta	atistical analysis (6 credits)	Academic Year	2017		
Offering Department	Statistics &	Actuarial Science	Quota			
Course Co-ordinator	Dr F Jiang,	Statistics & Actuarial Science (feijiang@hku.hk)				
Teachers Involved	(Dr F Jiang	,Statistics & Actuarial Science)				
Course Objectives	techniques	sis of variability is mainly concerned with locating the s investigate these sources through the use of 'linear' months these models.	,	,		
Course Contents & Topics	<ol> <li>(1) Simple linear regression: least squares method, analysis of variance, coefficient of determination, hypothesis tests and confidence intervals for regression parameters, prediction.</li> <li>(2) Multiple linear regression: least squares method, analysis of variance, coefficient of determination, reduced vs full models, hypothesis tests and confidence intervals for regression parameters, prediction, polynomial regression.</li> <li>(3) One-way classification models: one-way ANOVA, analysis of treatment effects, contrasts.</li> <li>(4) Two-way classification models: interactions, two-way ANOVA for balanced data structures, analysis of treatment effects, contrasts, randomised complete block design.</li> <li>(5) Universal approach to linear modelling: dummy variables, 'multiple linear regression' representation of one-way and two-way (unbalanced) models, ANCOVA models, concomitant variables.</li> <li>(6) Regression diagnostics: leverage, residual plot, normal probability plot, outlier, studentized residual, influentia observation, Cook's distance, multicollinearity, model transformation.</li> </ol>					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 understand linear regression model with one or multiple independent variables					
	CLO 2 understand ANOVA models for one and two factors					
	CLO 3 understand general linear model with categorical and continuous independent variables					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT2602; and Not for students who have passed in STAT3907, or have already enrolled in this course.					
Offer in 2017 - 2018	Y 1st s	em Offer in 2018 - 2019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)		Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logica to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.	I thinking, with evidence of originar situations. Apply highly effective	al thought, and ability e organizational and		
		Demonstrate substantial command of a broad range of knowledge and s learning outcomes. Show evidence of analytical and critical abilities and lo and some unfamiliar situations. Apply effective organizational and present	gical thinking, and ability to apply			
	С	Demonstrate general but incomplete command of knowledge and skills	s required for attaining most of	the course learning		

		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar situations. Apply moderately effective organizational and presentational skills.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning out of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowled problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	sed course						
Course Teaching	Activities		Details			No. of Hours		
& Learning Activities	Lectures					36		
	Tutorials					12		
	Reading / Self study					100		
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework tutorials and a	(assignments, test)	25	CLO 1,2,3		
	Examination		One 2-hour wr	itten examination	75	CLO 1,2,3		
Required/recommended reading and online materials	Michael H Kutner, Christopher J. Nachtsheim, John Neter, William Li: Applied Linear Statistical Models (McGraw-Hill/Irwin; 5th edition) Berry, D. A. & Lindgren, B. W.: Statistics: Theory and Methods (Duxbury Belmont, 1996) Draper, N. R. & Smith, H.: Applied Regression Analysis (Wiley, New York, 1998) Krzanowski, W. J.: An Introduction to Statistical Modelling (Arnold, London, 1998) Montgomery, D. C. & Peck, E. A.: Introduction to Linear Regression Analysis (Wiley, New York, 1992)							
Course Website	moodle.hk	u.hk		-				

Course website	moodie.nk	u.iiix				
CT A T2CO2	Ctatiatia	al informaco (C avad	:4~\	Academic Yea	. 2017	
STAT3602		al inference (6 cred	its)			
Offering Department Course Co-ordinator		& Actuarial Science	rial Science (smslee@hku.hk)	Quota		
Feachers Involved		S Lee, Statistics & Actua S Lee,Statistics & Actua				
Course Objectives		,	I theory of point estimation, interval	estimation and hypothesi	e teeting   Lleing	
Sourse Objectives	mathemati statistical	ically-oriented approach methodologies and the	n, the course provides a solid and underlying concepts and theory. It up a career in statistical research.	rigorous treatment of infe	erential problems	
Course Contents			•			
& Topics	<ol> <li>Paradigms of inference: frequentist, Bayesian, Fisherian.</li> <li>Decision theory: loss function; risk; decision rule; admissibility; minimaxity; unbiasedness; Bayes' rule.</li> <li>Estimation theory: exponential families; likelihood; sufficiency; minimal sufficiency; ancillarity; completeness; UMVU estimators; information inequality; large-sample theory of maximum likelihood estimation.</li> <li>Hypothesis testing: uniformly most powerful test; monotone likelihood ratio; unbiasedness; UMP unbiased test; maximal invariants; most powerful invariant test; large-sample theory of likelihood ratio.</li> </ol>					
Course Learning	On succes	sful completion of this of	course, students should be able to:			
Outcomes	CLO 1	form a panoramic view	of classical developments in mather	natical statistics		
	CLO 2	gain thorough insight in	to the essentials of statistical inferen	ce		
	CLO 3	build a solid foundation	for future research studies in statistic	cs and related areas		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S1	FAT2602 or STAT3902				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	019 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lact of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details		No. of Hours	
Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin	
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3	
	Examination One 2-hour written examination 75 CLO 1,2,3					
Required/recommended reading and online materials						

	Young, G.A. & Smith, R.L.: Essentials of Statistical Inference (Cambridge University Press: Cambridge, 2005).	
Course Website	moodle.hku.hk	

STAT3603	Probabil	lity modelling (6 cre	edits)	Academic Yea	ır 2017		
Offering Department	Statistics	& Actuarial Science		Quota			
Course Co-ordinator			cience (mazhuke@hku.hk)				
Teachers Involved		Statistics & Actuarial So					
Course Objectives		This is an introductory course in probability modelling. A range of important topics in stochastic processes will be discussed.					
Course Contents & Topics	classificati states, Po Brownian formula, C	Introduction to probability theory, conditional probability and expectation, Markov chains, random walk models, classification of states in a Markov chain, calculation of limiting probabilities and mean time spent in transient states, Poisson process, distribution of inter-arrival time and waiting time, conditional distribution of the arrival time, Brownian Motion, hitting time and maximum variable, geometric Brownian motion, the Black-Scholes option pricing formula, Gaussian bridge, and stationary processes. Birth-and-death process, branching process and renewal process may also be covered (if time permits).					
Course Learning	On succes	On successful completion of this course, students should be able to:					
Outcomes			nethod to calculate the mean and pro				
	CLO 2	understand the essentia	ls of Markov chains, the Poisson pro	cess, and Brownian motio	n		
	CLO 3	understand how stochas	stic models can be applied to the stu-	dy of real-life phenomena			
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for stu	•	d in MATH3603, or have already enro d in STAT3903, or have already enro				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3		
	Examinat		One 2-hour written examination	75	CLO 1,2,3		
Required/recommended reading and online materials	S. M. Ros	S. M. Ross: Introduction to Probability Models (9th edition)					
online materials							

STAT3604	Design a	and analysis of experiments (6 credits)	Academic Year	2017			
Offering Department	Statistics 8	& Actuarial Science	Quota				
Course Co-ordinator	Dr R W L	Wong, Statistics & Actuarial Science (rwong@hku.hk)	<u>'</u>				
Teachers Involved	(Dr R W L	Wong, Statistics & Actuarial Science)					
Course Objectives	basic princ	research often requires proper design and analysis of experin ciples of experimental design; to explain the concepts and to de f experiment.					
Course Contents & Topics	randomise	Basic principles and guidelines for designing experiments. Analysis for experiments with a single factor, randomised block, crossed and nested factorial structure. Balanced incomplete factorial experiments. Latin squares and related designs. Fixed/random effects models.					
Course Learning	On succes	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 develop a conceptual understanding of experimental design						
	CLO 2 acquire the fundamental statistical tools of experimental design and the understanding to use them appropriately						
	CLO 3 select appropriate experimental designs for different problems						
	CLO 4 select appropriate statistical model and to know how to validate the model						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	Pass in STAT2602 or STAT3611 or STAT3902					
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2019 : Y	Examination	May			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowled learning outcomes. Show strong analytical and critical abilities and logical thit to apply knowledge to a wide range of complex, familiar and unfamiliar sit presentational skills.	inking, with evidence of origina	al thought, and ability			
		Demonstrate substantial command of a broad range of knowledge and skills	s required for attaining at leas	t most of the course			

	В	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to far and some unfamiliar situations. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course lear					
	С	outcomes. Show evidence of	ncomplete command of knowledge and so of some analytical and critical abilities and derately effective organizational and preser	l logical thinking, and ability to a			
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the co. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Sho knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no evid of analytical and critical ab	consider the problems. Apply limited of barely circletter digital gains and presentational states. The properties are proposed and skills required for attaining the course learning outcomes. Learnalytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to so oblems. Organization and presentational skills are minimally effective or ineffective.				
Course Type	Lecture-ba	ased course	·				
Course Teaching	Activities	•	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading / Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4		
	Examinati	on	One 2-hour written examination	75	CLO 1,2,3,4		
Required/recommended reading and online materials	D. R. Cox: A. L. Edwa G. A. Ferg C. R. Hick P. W. M. J	O. C. Montgomery: Design and Analysis of Experiments (Wiley, 1997, 4th edition) O. R. Cox: Planning of Experiments (Wiley, 1958) A. L. Edwards: Experimental Design in Psychological Research (Harper & Row, 1985, 5th edition) G. A. Ferguson & Y. Takane: Statistical Analysis in Psychology and Education (McGraw Hill, 1989, 6th edition) C. R. Hicks & K. V. Turner Jr.: Fundamental Concepts in the Design of Experiments (Oxford, 1999, 5th edition) P. W. M. John: Statistical Design and Analysis of Experiments (Macmillan, 1971) R. L. Moson, R. F. Gungst, & J. L. Hess: Statistical Design and Analysis of Experiments (Wiley, 1989)					
Course Website	moodle.hk		2 00 gr and / mary		, ,		

STAT3605	Quality	control and manage	ement (6 credits)	Academic Ye	<b>ar</b> 2017	
Offering Department	Statistics	& Actuarial Science	<u> </u>	Quota		
Course Co-ordinator	TBC, Sta	tistics & Actuarial Science	ce ()			
Teachers Involved						
Course Objectives	course p presents reliability, six-sigma	rovides an overview of a variety of statistical and life-testing. Conte	in production is a matter of primary f quality compromise which involve solutions including control charts, a mporary quality management systen introduced. The student is brought	s both the producer and acceptance and sequent as such as total quality of	d the consumer. It ial sampling plans ontrol, zero defects	
Course Contents & Topics	control, v sampling testing. E	Probability distributions and their applications, process variability, sampling and statistical inference. Process control, variables and attributes control charts. Operating characteristic curves. Single, double and sequential sampling plans. MIL-STD-105D and Dodge-Romig schemes. Variables sampling. Reliability and lifetesting. Elementary experimental designs. Management of quality control, total quality control, zero defects, six-sigma, and ISO 9000.				
Course Learning	On succe	ssful completion of this	course, students should be able to:			
Outcomes	CLO 1	appreciate the practicalit	ty of statistical concepts and methods	s in general		
	CLO 2	understand how certain	specific statistical methods can bene	fit various production situa	ations	
	CLO 3 know the traditional and modern systems of quality management					
Pre-requisites (and Co-requisites and Impermissible combinations)	course) c		30 and any University level 2 course University level 2 course) or STAT26			
Offer in 2017 - 2018	N Of	N Offer in 2018 - 2019 : Y Examination				
Grade Descriptors (A+ to F)		IEI III 2010 - 2019 . 1		Examination		
	A	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.	stery at an advanced level of extensive kno strong analytical and critical abilities and logic vide range of complex, familiar and unfamilia	wledge and skills required for al thinking, with evidence of ori- ar situations. Apply highly effec	ginal thought, and ability ctive organizational and	
	В	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills. Demonstrate substantial c learning outcomes. Show e and some unfamiliar situation	strong analytical and critical abilities and logic vide range of complex, familiar and unfamili- command of a broad range of knowledge and vidence of analytical and critical abilities and lons. Apply effective organizational and preser	wledge and skills required for al thinking, with evidence of ori- ar situations. Apply highly effer skills required for attaining at I ogical thinking, and ability to ap tational skills.	ginal thought, and ability ctive organizational and east most of the course ply knowledge to familia	
	A	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills. Demonstrate substantial or learning outcomes. Show e and some unfamiliar situatii Demonstrate general but outcomes. Show evidence	strong analytical and critical abilities and logic vide range of complex, familiar and unfamili ommand of a broad range of knowledge and vidence of analytical and critical abilities and I	wledge and skills required for al thinking, with evidence of origan situations. Apply highly effect skills required for attaining at I ogical thinking, and ability to ap tational skills. Ils required for attaining most ogical thinking, and ability to a	ginal thought, and ability ctive organizational and east most of the course ply knowledge to familia of the course learning	
	В	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.  Demonstrate substantial colearning outcomes. Show e and some unfamiliar situationations. Apply much permonstrate general but outcomes. Show evidence familiar situations. Apply much permonstrate partial but lim Show evidence of some co	strong analytical and critical abilities and logic vide range of complex, familiar and unfamili- ommand of a broad range of knowledge and vidence of analytical and critical abilities and I ons. Apply effective organizational and preser incomplete command of knowledge and ski of some analytical and critical abilities and I	wledge and skills required for all thinking, with evidence of origar situations. Apply highly effects skills required for attaining at logical thinking, and ability to aptational skills. Ills required for attaining most ogical thinking, and ability to a attonal skills. edd for attaining some of the coallytical and critical abilities. She	ginal thought, and ability ctive organizational and east most of the course ply knowledge to familia of the course learning pply knowledge to mos urse learning outcomes	
	A B C	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.  Demonstrate substantial colearning outcomes. Show e and some unfamiliar situation Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lim Show evidence of some coknowledge to solve problem Demonstrate little or no evio of analytical and critical a	strong analytical and critical abilities and logic vide range of complex, familiar and unfamili- ommand of a broad range of knowledge and vidence of analytical and critical abilities and I ons. Apply effective organizational and preser incomplete command of knowledge and ski of some analytical and critical abilities and I oderately effective organizational and present inted command of knowledge and skills requir herent and logical thinking, but with limited ar	wledge and skills required for all thinking, with evidence of origar situations. Apply highly effects skills required for attaining at logical thinking, and ability to aptational skills. Ils required for attaining most ogical thinking, and ability to a attonal skills. The stational skills and critical abilities. Shound and presentational skills equired for attaining the course overy little or no ability to aptational skills.	ginal thought, and ability ctive organizational and east most of the course ply knowledge to familia of the course learning pply knowledge to most urse learning outcomes by limited ability to apply learning outcomes. Lack	
(A+ to F)	A B C D Fail	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.  Demonstrate substantial colearning outcomes. Show e and some unfamiliar situation Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lim Show evidence of some coknowledge to solve problem Demonstrate little or no evio of analytical and critical a	strong analytical and critical abilities and logic vide range of complex, familiar and unfamiliar and unfamiliar and unfamiliar and critical abilities and I ons. Apply effective organizational and preser incomplete command of knowledge and skil of some analytical and critical abilities and I odsome and skills required the command of knowledge and skills required and some and some and specifical thinking, but with limited ans. Apply limited or barely effective organization dence of command of knowledge and skills restillities, logical and coherent thinking. Show	wledge and skills required for all thinking, with evidence of origar situations. Apply highly effects skills required for attaining at logical thinking, and ability to aptational skills. Ils required for attaining most ogical thinking, and ability to a attonal skills. The stational skills and critical abilities. Shound and presentational skills equired for attaining the course overy little or no ability to aptational skills.	ginal thought, and ability ctive organizational and east most of the course ply knowledge to familia of the course learning pply knowledge to most urse learning outcomes by limited ability to apply learning outcomes. Lack	
(A+ to F)  Course Type Course Teaching	A B C D Fail	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.  Demonstrate substantial colearning outcomes. Show e and some unfamiliar situations. Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lim Show evidence of some coknowledge to solve problem Demonstrate little or no evidence of analytical and critical a problems. Organization and assed course	strong analytical and critical abilities and logic vide range of complex, familiar and unfamiliar and unfamiliar and unfamiliar and critical abilities and I ons. Apply effective organizational and preser incomplete command of knowledge and skil of some analytical and critical abilities and I odsome and skills required the command of knowledge and skills required and some and some and specifical thinking, but with limited ans. Apply limited or barely effective organization dence of command of knowledge and skills restillities, logical and coherent thinking. Show	wledge and skills required for all thinking, with evidence of origar situations. Apply highly effects skills required for attaining at logical thinking, and ability to aptational skills. Ils required for attaining most ogical thinking, and ability to a attonal skills. The stational skills and critical abilities. Shound and presentational skills equired for attaining the course overy little or no ability to aptational skills.	ginal thought, and ability ctive organizational and east most of the course ply knowledge to familia of the course learning pply knowledge to most urse learning outcomes by limited ability to apply learning outcomes. Lack	
(A+ to F)  Course Type Course Teaching	A B C D Fail	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.  Demonstrate substantial colearning outcomes. Show e and some unfamiliar situations. Demonstrate general but outcomes. Show evidence familiar situations. Apply more problems be solve problem Demonstrate partial but lim Show evidence of some coknowledge to solve problem Demonstrate little or no evidence of analytical and critical a problems. Organization and assed course	strong analytical and critical abilities and logic vide range of complex, familiar and unfamiliar and unfamiliar and unfamiliar and property of a property of an alytical and critical abilities and I ons. Apply effective organizational and presentincomplete command of knowledge and skil of some analytical and critical abilities and I oderately effective organizational and presentiated command of knowledge and skills requirement and logical thinking, but with limited ans. Apply limited or barely effective organizational and property of the present and logical thinking, but with limited and ene of command of knowledge and skills rebilities, logical and coherent thinking. Show different and logical thinking are minimally effective organizational skills are minimally effective organizational and organizati	wledge and skills required for all thinking, with evidence of origar situations. Apply highly effects skills required for attaining at logical thinking, and ability to aptational skills. Ils required for attaining most ogical thinking, and ability to a attonal skills. The stational skills and critical abilities. Shound and presentational skills equired for attaining the course overy little or no ability to aptational skills.	ginal thought, and ability ctive organizational and east most of the course ply knowledge to familia of the course learning pply knowledge to mos urse learning outcomes by limited ability to apply knowledge to solve	
(A+ to F)  Course Type Course Teaching	B C D Fail Lecture-b Activitie	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.  Demonstrate substantial ct learning outcomes. Show evand some unfamiliar situation. Show evidence familiar situations. Apply m Demonstrate partial but lim Show evidence of some coknowledge to solve problem. Demonstrate little or no evi of analytical and critical a problems. Organization and assed course	strong analytical and critical abilities and logic vide range of complex, familiar and unfamiliar and unfamiliar and unfamiliar and property of a property of an alytical and critical abilities and I ons. Apply effective organizational and presentincomplete command of knowledge and skil of some analytical and critical abilities and I oderately effective organizational and presentiated command of knowledge and skills requirement and logical thinking, but with limited ans. Apply limited or barely effective organizational and property of the present and logical thinking, but with limited and ene of command of knowledge and skills rebilities, logical and coherent thinking. Show different and logical thinking are minimally effective organizational skills are minimally effective organizational and organizati	wledge and skills required for all thinking, with evidence of origar situations. Apply highly effects skills required for attaining at logical thinking, and ability to aptational skills. Ils required for attaining most ogical thinking, and ability to a attonal skills. The stational skills and critical abilities. Shound and presentational skills equired for attaining the course overy little or no ability to aptational skills.	ginal thought, and ability ctive organizational and east most of the course ply knowledge to familia of the course learning pply knowledge to mosurse learning outcomes ow limited ability to apply knowledge to solve No. of Hours	
Course Type	B C D Fail Lecture-b Activitie Lectures Tutorials	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.  Demonstrate substantial ct learning outcomes. Show evand some unfamiliar situation. Show evidence familiar situations. Apply m Demonstrate partial but lim Show evidence of some coknowledge to solve problem. Demonstrate little or no evi of analytical and critical a problems. Organization and assed course	strong analytical and critical abilities and logic vide range of complex, familiar and unfamiliar and unfamiliar and unfamiliar and property of a property of an alytical and critical abilities and I ons. Apply effective organizational and presentincomplete command of knowledge and skil of some analytical and critical abilities and I oderately effective organizational and presentiated command of knowledge and skills requirement and logical thinking, but with limited ans. Apply limited or barely effective organizational and property of the present and logical thinking, but with limited and ene of command of knowledge and skills rebilities, logical and coherent thinking. Show different and logical thinking are minimally effective organizational skills are minimally effective organizational and organizati	wledge and skills required for all thinking, with evidence of origar situations. Apply highly effects skills required for attaining at logical thinking, and ability to aptational skills. Ils required for attaining most ogical thinking, and ability to a attonal skills. The stational skills and critical abilities. Shound and presentational skills equired for attaining the course overy little or no ability to aptational skills.	ginal thought, and abilitictive organizational and east most of the course ply knowledge to familia of the course learning pply knowledge to most urse learning outcomes ow limited ability to appl learning outcomes. Lac ply knowledge to solve No. of Hours 36	
Course Type Course Teaching & Learning Activities  Assessment Methods	B C D Fail Lecture-b Activitie Lectures Tutorials	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.  Demonstrate substantial act learning outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lim Show evidence of some co knowledge to solve problem Demonstrate little or no evi of analytical and critical a problems. Organization and assed course	strong analytical and critical abilities and logic vide range of complex, familiar and unfamiliar and unfamiliar and unfamiliar and property of a property of an alytical and critical abilities and I ons. Apply effective organizational and presentincomplete command of knowledge and skil of some analytical and critical abilities and I oderately effective organizational and presentiated command of knowledge and skills requirement and logical thinking, but with limited ans. Apply limited or barely effective organizational and property of the present and logical thinking, but with limited and ene of command of knowledge and skills rebilities, logical and coherent thinking. Show different and logical thinking are minimally effective organizational skills are minimally effective organizational and organizati	wledge and skills required for all thinking, with evidence of origar situations. Apply highly effects skills required for attaining at logical thinking, and ability to aptational skills. Ils required for attaining most ogical thinking, and ability to a attonal skills. The stational skills and critical abilities. Shound and presentational skills equired for attaining the course overy little or no ability to aptational skills.	ginal thought, and abilitictive organizational and east most of the course ply knowledge to familia of the course learning pply knowledge to mos urse learning outcomes by limited ability to apply knowledge to solve No. of Hours  36 12 100 Assessment Methods	
	B C D Fail Lecture-b Activitie Lectures Tutorials Reading	Demonstrate thorough ma learning outcomes. Show s to apply knowledge to a v presentational skills.  Demonstrate substantial at learning outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lim Show evidence of some co knowledge to solve problem Demonstrate little or no evi of analytical and critical a problems. Organization and assed course  S	strong analytical and critical abilities and logic vide range of complex, familiar and unfamiliar and unfamiliar and unfamiliar and critical abilities and lovidence of analytical and critical abilities and lons. Apply effective organizational and preser incomplete command of knowledge and ski of some analytical and critical abilities and loderately effective organizational and present hited command of knowledge and skills requirement and logical thinking, but with limited arns. Apply limited or barely effective organizatio dence of command of knowledge and skills rebilities, logical and coherent thinking. Show dipresentational skills are minimally effective organizational and present and organizational skills are minimally effective organizational and present and organizati	wledge and skills required for all thinking, with evidence of orial thinking, with evidence of orial thinking. Apply highly effect skills required for attaining at logical thinking, and ability to aptational skills.  Ils required for attaining most opical thinking, and ability to a attonal skills.  The deformation of the coalytical and critical abilities. Should and presentational skills.  Equired for attaining the course overy little or no ability to apprint the course of	ginal thought, and ability ctive organizational and east most of the course ply knowledge to familia of the course learning pply knowledge to most urse learning outcomes ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36  12  100  Assessment	

STAT3606	Busines	s logistics (6 credits	s)	Academic Yea	ar 2017		
Offering Department	Statistics 8	& Actuarial Science		Quota			
Course Co-ordinator	Ms O T K	Choi, Statistics & Actuar	rial Science (ochoi@saas.hku.hk)				
Teachers Involved		Choi, Statistics & Actuar	,				
Course Objectives	budgeting	Modern business corporations are increasingly using logistics as a management tool, for example, in capital budgeting problems, production planning, scheduling, transportations and deciding location for a new factory. This course addresses the business applications of logistics.					
Course Contents & Topics	logistic pro	n this course, students will apply the analytical skills with aid of computer techniques in solving the business agistic problems. Topics include optimization techniques applied in allocation of resources, financial planning, ansportation, assignment, inventory control and queuing problems.					
Course Learning			ourse, students should be able to:				
Outcomes		1 0 0	with Graphical approach, Simplex r				
	CLO 2 set-up and solve network flow problems using least-cost approach, MODI method and approximation.  CLO 3 understand decision theory and its applications						
			ctiveness of service systems	(07474004			
Pre-requisites (and Co-requisites and Impermissible	course) or course) or	(STAT1602 and any U STAT2901; and	0 and any University level 2 cours niversity level 2 course) or STAT2	601 or (STAT1603 and an			
combinations)			MATH3901, or have already enrol		Doo		
Offer in 2017 - 2018		sem Offer in 2018 - 20		Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type		ased course					
Course Teaching	Activities	•	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials	0.15.1.1			12		
A		Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts	Coursework (assignments, tutorials and a test)	25	CLO 1,2,3,4		
	Examinati	on	One 2-hour written examination	75	CLO 1,2,3,4		
Required/recommended reading and online materials	Wayne L. H. Taha: A F.S. Hillier	Winston: Operations Re on Introduction to Opera and G, J. Lieberman: A	antitative Analysis for Managemen search, 4th edition, Thomson Lear tions Research, 8th edition, Pearso in Introduction to Operations Resea art and Winston: Introduction to Lir	ning on International Edition arch			
Course Website	moodle.hk		ant and viniston. Introduction to Eli	icai Aigebia			
	THOOGIC.TIN	ie.nku.nk					

STAT3607	Statistics credits)	in clinical medicine and bio-medical research (6	Academic Year	2017	
Offering Department	Statistics &	Actuarial Science	Quota		
Course Co-ordinator	TBC, Statis	stics & Actuarial Science ()			
Teachers Involved					
Course Objectives	the clinical designs. It size and po	esearch, medical data are often observed which motivates the all observational and decision-making process. Also, statistical prinvolves phase I, II, III and IV clinical trial designs, both Bayesia ower calculation. No knowledge in biology or medicine is assume background when the statistical problems are introduced.	roblems often arise n and frequentist app	from clinical trial proaches, sample	
Course Contents & Topics	The contents of the course include contingency tables, regression models, survival analysis, categorical data analysis, Bayesian designs, dose-finding methods, sample size and power calculation, phase I, II and III trial designs, hypothesis testing, adaptive designs.				
Course Learning	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 understand the basic concepts in medical statistics				
	CLO 2 design clinical trials and compute sample sizes				
	CLO 3 conduct statistical inference and apply regression models				
	CLO 4 solve medical problems by using various statistical tests				
Pre-requisites	Pass in ST	AT2602 or STAT3902			

(and Co-requisites						
and Impermissible						
combinations)						
Offer in 2017 - 2018		fer in 2018 - 2019 : Y		Examination		
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	learning outcomes. Show ev	mmand of a broad range of knowledge and idence of analytical and critical abilities and I ns. Apply effective organizational and preser	ogical thinking, and ability to ap		
	С	outcomes. Show evidence of	ncomplete command of knowledge and ski of some analytical and critical abilities and l derately effective organizational and present	ogical thinking, and ability to a		
	D	Demonstrate partial but limit Show evidence of some coh	ted command of knowledge and skills requir erent and logical thinking, but with limited ar s. Apply limited or barely effective organization	red for attaining some of the co allytical and critical abilities. Sho		
	Fail	Demonstrate little or no evid of analytical and critical ab	ence of command of knowledge and skills re illities, logical and coherent thinking. Show presentational skills are minimally effective of	equired for attaining the course very little or no ability to ap		
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4	
	Examination		One 2-hour written examination	75	CLO 1,2,3,4	
Required/recommended reading and online materials	Hall/CRC J. Aitchiso P. Armita P. Armita D. Altmar N. E. Bres (Lyon: IAI D. R. Cox	J. Aitchison, J. W. Kay & I. J. Lauder: Statistical Concepts and Applications in Clinical Medicine (Chapman & Hall/CRC, 2004) J. Aitchison & J. Dunsmore: Statistical Prediction Analysis (Cambridge University Press, 1976) P. Armitage: Statistical Methods in Medical Research (Oxford: Blackwell, 1971) P. Armitage: Sequential Medical Trials (Oxford: Blackwell, 1975, 2nd edition) D. Altman: Practical Statistics for Medical Research (London: Chapman & Hall, 1991) N. E. Breslow & N. E. Day: Statistical Methods in Cancer Research Volume 1 - The analysis of case-control studie (Lyon: IARC, 1980) D. R. Cox & E. J. Snell: The Analysis of Binary Data (London: Chapman and Hall, 1989, 2nd edition) D. R. Cox & D. V. Hinkley: Theoretical Statistics (London: Chapman and Hall, 1974)				
Course Website	moodle.h	•	asa. statistics (Eoridon: Shapinan a	ind riall, 1017)		
Additional Course Information	Other refe E. K. Hari B. Jones B. J. T. M S. J. Poco	erences: ris & A. Albert: Survivorsh & M. G. Kenward: Desigr lorgan: Analysis of Quant ock: Clinical Trials. A Pra	nip Analysis for Clinical Studies (New n and Analysis of Cross-Over Trials tal Response Data (London: Chapm actical Approach (Chickestes: John eralised Linear Models (London: Cha	(London: Chapman and I an and Hall, 1992) Wiley & Sons, 1991)	Hall, 1990)	

STAT3608	Statis	tical genetics (6 credits)		Academic Year	2017		
Offering Department	Statistic	cs & Actuarial Science		Quota			
Course Co-ordinator	TBC, S	tatistics & Actuarial Science ()					
Teachers Involved							
Course Objectives	genetic	ourse aims to provide students with a function of the epidemiology in gene mapping and to both and genetic problems.	•	•			
Course Contents & Topics	equilibr and kir analysis	This course will cover the following topics: background of genetics; Mendelian inheritance; Hardy-Weinberg equilibrium; linkage equilibrium; chi-square test; likelihood ratio test; exact test; match probability; paternity testing and kinship analysis; DNA mixed stain; relatedness; population structure; gene mapping; parametric linkage analysis; non-parametric linkage analysis; linkage disequilibrium; association designs; case-control analysis; family-based association study; quantitative traits.					
Course Learning	On suc	cessful completion of this course, stude	ents should be able to:				
Outcomes	CLO 1 understand the fundamental principles in statistical DNA forensics and genetic epidemiology						
	CLO 2 know the usefulness and possible limitations of statistical methodology in human identification and gene mapping						
	CLO 3 provide statistical solutions to specific problems in the field						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	STAT2602 or STAT3902					
Offer in 2017 - 2018	N C	Offer in 2018 - 2019 : Y	E	xamination			
Grade Descriptors (A+ to F)	A	learning outcomes. Show strong analytical	anced level of extensive knowledge and sl and critical abilities and logical thinking, wit omplex, familiar and unfamiliar situations. A	n evidence of origina	al thought, and ability		
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D	Show evidence of some coherent and logic	of knowledge and skills required for attaining cal thinking, but with limited analytical and cri l or barely effective organizational and preser	tical abilities. Show			
	Fail	Demonstrate little or no evidence of common of analytical and critical abilities, logical	and of knowledge and skills required for atta				

	problems. Organization and	presentational skills are minimally effective of	r ineffective.				
Course Type	Lecture-based course						
Course Teaching & Learning Activities	Activities	Details		No. of Hours			
	Lectures			36			
	Tutorials			12			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3			
	Examination	One 2-hour written examination	75	CLO 1,2,3			
Required/recommended reading and online materials	Ott, J.: Analysis of Human Genetic Ziegler, A. and Konig, I.R.: A Statis Evett, I. W. and Weir, B. S.: Interp	Clug, W. S. and Cummings, M. R.: Essentials of Genetics (Prentice Hall, 2002) bit, J.: Analysis of Human Genetic Linkage (The Johns Hopkins University Press, 1999, 3rd ed.) iegler, A. and Konig, I.R.: A Statistical Approach to Genetic Epidemiology (Wiley-VCH, 2006) ivett, I. W. and Weir, B. S.: Interpreting DNA Evidence (Sinauer Associates, Inc. Publishers, 1998) ung, W. K. and Hu, Y. Q.: Statistical DNA Forensics: Theory, Methods and Computation (Wiley, Sussex, 2008)					
Course Website	moodle.hku.hk	•	, ,	. ,			

-3 : 44 : 30119	The stat	The statistics of investment risk (6 credits)  Academic Year   2017					
STAT3609 Offering Department	Statistics & Actuarial Science Quota				ai 2017		
Course Co-ordinator		K P Wat, Statistics & Actuarial Science (watkp@hku.hk)					
Teachers Involved		at, Statistics & Actuarial	· , o ,				
Course Objectives			risk. The decision to invest or not	t is usually made agains	st a background of		
<b>,</b>	uncertaint rational fra rates, con	incertainty. Whilst prediction of the future is difficult, there are statistical modelling techniques which provide a ational framework for investment decisions, particularly those relating to stock markets and the markets for interest ates, commodities and currencies. Building upon research, both in Hong Kong and abroad, this course presents the prevailing statistical theories for prices and price-change in these vital markets.					
Course Contents			an-variance portfolio theory, capital		trage pricing theor		
& Topics	portfolio p	erformance and manage	ement, behavioural finance.				
Course Learning		· · · · · · · · · · · · · · · · · · ·	course, students should be able to:				
Outcomes		easure risk and return o	•				
			s in constructing optimal investment				
			ricing models and evaluate investme		4		
		rms of market efficiency	market efficiency and apply appropr	riate testing procedures	to assess differen		
Pre-requisites							
(and Co-requisites and Impermissible combinations)	Pass in (S Not for stu	ass in STAT2602, or already enrolled in this course, or ass in (STAT1603 and any University level 2 course) or STAT3611 or STAT3614; and ot for students who have passed in FINA2320, or have already enrolled in this course; and ot for BSc(Actuarial Science) students					
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilit to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familial and some unfamiliar situations. Apply effective organizational and presentational skills.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
		familiar situations. Apply mo	oderately effective organizational and presenta	ational skills.			
	D	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col knowledge to solve problem	oderately effective organizational and presenta ited command of knowledge and skills requiri- herent and logical thinking, but with limited an- is. Apply limited or barely effective organizatio	ational skills.  ed for attaining some of the co- laytical and critical abilities. Sho land and presentational skills.	urse learning outcome ow limited ability to app		
	Fail	familiar situations. Apply mc Demonstrate partial but limi Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and	oderately effective organizational and presenta ited command of knowledge and skills requir herent and logical thinking, but with limited an	ational skills.  ed for attaining some of the co- alytical and critical abilities. Sho- mal and presentational skills.  equired for attaining the course of	urse learning outcome ow limited ability to app learning outcomes. Lac		
	Fail Lecture-ba	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical al problems. Organization and assed course	oderately effective organizational and presenta- ited command of knowledge and skills requiri- herent and logical thinking, but with limited an- is. Apply limited or barely effective organizatio dence of command of knowledge and skills re bilities, logical and coherent thinking. Show I presentational skills are minimally effective or	ational skills.  ed for attaining some of the co- alytical and critical abilities. Sho- mal and presentational skills.  equired for attaining the course of	urse learning outcome: ow limited ability to app learning outcomes. Lac ply knowledge to solv		
Course Type Course Teaching	Fail Lecture-ba	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical al problems. Organization and assed course	oderately effective organizational and presenta ited command of knowledge and skills requirn herent and logical thinking, but with limited and as. Apply limited or barely effective organization dence of command of knowledge and skills re bilities, logical and coherent thinking. Show	ational skills.  ed for attaining some of the co- alytical and critical abilities. Sho- mal and presentational skills.  equired for attaining the course of	urse learning outcomes ow limited ability to app learning outcomes. Lac ply knowledge to solve No. of Hours		
Course Teaching	Fail  Lecture-ba Activities Lectures	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical al problems. Organization and assed course	oderately effective organizational and presenta- ited command of knowledge and skills requiri- herent and logical thinking, but with limited an- is. Apply limited or barely effective organizatio dence of command of knowledge and skills re bilities, logical and coherent thinking. Show I presentational skills are minimally effective or	ational skills.  ed for attaining some of the co- alytical and critical abilities. Sho- mal and presentational skills.  equired for attaining the course of	urse learning outcomes ow limited ability to app learning outcomes. Lac ply knowledge to solve No. of Hours 36		
	Fail  Lecture-ba Activities Lectures Tutorials	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and assed course	oderately effective organizational and presenta- ited command of knowledge and skills requiri- herent and logical thinking, but with limited an- is. Apply limited or barely effective organizatio dence of command of knowledge and skills re bilities, logical and coherent thinking. Show I presentational skills are minimally effective or	ational skills.  ed for attaining some of the co- alytical and critical abilities. Sho- mal and presentational skills.  equired for attaining the course of	urse learning outcomes by limited ability to app learning outcomes. Lac ply knowledge to solve  No. of Hours  36 12		
Course Teaching & Learning Activities	Fail  Lecture-ba Activities Lectures Tutorials Reading /	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and assed course	oderately effective organizational and presentalited command of knowledge and skills requirineerent and logical thinking, but with limited an is. Apply limited or barely effective organizatio dence of command of knowledge and skills rebilities, logical and coherent thinking. Show I presentational skills are minimally effective or Details	ational skills.  ed for attaining some of the co alytical and critical abilities. Sho anal and presentational skills.  equired for attaining the course very little or no ability to appr r ineffective.	urse learning outcomes ow limited ability to app learning outcomes. Lac ply knowledge to solve  No. of Hours  36  12  100		
Course Teaching & Learning Activities Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and assed course	derately effective organizational and presentalited command of knowledge and skills requirinerent and logical thinking, but with limited ans. Apply limited or barely effective organizatiodence of command of knowledge and skills rebilities, logical and coherent thinking. Show I presentational skills are minimally effective or Details  Details  Details	ational skills.  ed for attaining some of the co- alytical and critical abilities. Sho- mal and presentational skills.  equired for attaining the course of	urse learning outcomes by limited ability to app learning outcomes. Lac ply knowledge to solve  No. of Hours  36 12		
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading /	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical al problems. Organization and ased course	oderately effective organizational and presentalited command of knowledge and skills requirineerent and logical thinking, but with limited an is. Apply limited or barely effective organizatio dence of command of knowledge and skills rebilities, logical and coherent thinking. Show I presentational skills are minimally effective or Details	ational skills.  ed for attaining some of the co allytical and critical abilities. Sho nal and presentational skills.  equired for attaining the course i very little or no ability to api r ineffective.  Weighting in final	urse learning outcomes by limited ability to app learning outcomes. Lac ply knowledge to solve   No. of Hours  36 12 100  Assessment Methods		
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading / Methods	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical al problems. Organization and assed course  S  Self study	pderately effective organizational and presentalited command of knowledge and skills requirinerent and logical thinking, but with limited ans. Apply limited or barely effective organizatio dence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective or petails    Details   Details	ational skills.  ed for attaining some of the co alytical and critical abilities. Sho anal and presentational skills.  equired for attaining the course i very little or no ability to apprinterior.  Weighting in final course grade (%)	urse learning outcomes by limited ability to app learning outcomes. Lac ply knowledge to solv  No. of Hours 36 12 100 Assessment Methods to CLO Mappin		
Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinat	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical al problems. Organization and assed course  / Self study	pderately effective organizational and presentalited command of knowledge and skills requiriberent and logical thinking, but with limited ans. Apply limited or barely effective organizatio dence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective or petails    Details	ational skills.  ed for attaining some of the co alytical and critical abilities. Sho anal and presentational skills.  equired for attaining the course is very little or no ability to apprinterior.  Weighting in final course grade (%)  30  70	urse learning outcome by limited ability to app learning outcomes. Larply knowledge to solv  No. of Hours  36  12  100  Assessment Methods to CLO Mappin  CLO 1,2,3,4  CLO 1,2,3,4		
Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinat Bodie, Z., Elton, E., Analysis (i Luenberge Defusco, Institute Irr Fabozzi, F Cointegral Ruppert, I	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evid of analytical and critical at problems. Organization and assed course (Self study)  Pents ion  Kane, A., Marcus, A. J. J., Gruber, M. J., Brown Sth Edition). John Wiley, er, D. G. (2009). Investm R. A., McLeavey, D. Wivestment Series (2nd E. J., Focardi, S. M., an tion. New Jersey: Wiley. D. (2004). Statistics and S. F. and Chiang, R. C. long.	pderately effective organizational and presentatited command of knowledge and skills requiriberent and logical thinking, but with limited anis. Apply limited or barely effective organizatio dence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective or pre	ational skills.  ed for attaining some of the co alytical and critical abilities. Sho anal and presentational skills.  equired for attaining the course is very little or no ability to apprinterior.  Weighting in final course grade (%)  30  70 sia Global Edition). McGra 11). Modern Portfolio The Oxford University Press. 2007). Quantitative Investre delling of the Equity Mar Springer.	urse learning outcome by limited ability to app learning outcomes. Laply knowledge to solv  No. of Hours  36 12 100 Assessment Methods to CLO Mappin CLO 1,2,3,4 CLO 1,2,3,4 aw-Hill. Bory and Investme		

STAT3610	Risk ma	nagement and insเ	ırance (6 credits)	Academic Year	2017			
Offering Department	Statistics &	atistics & Actuarial Science Quota						
Course Co-ordinator	Dr R W L	Wong, Statistics & Actu	arial Science (rwong@hku.hk)					
Teachers Involved	(Dr R W L	Wong, Statistics & Actu	ıarial Science)					
Course Objectives	products, techniques minimal ba	To provide knowledge on basic risk and its management, as well as basic financial planning though insurance products, to students. To allow students to understand the statistical, financial and legal principles underlying the techniques for managing the insurable risks faced by organisations and individuals. Aiming at students who have minimal background in quantitative methods, it involves very minimal quantitative calculations and is not available to students majoring in Actuarial Science.						
Course Contents & Topics	The cours - risk in ou - insuranc - introduct - fundame - life insura	e introduces and explain r society, e and risk, ion to risk managemen	ns: t, d analysis of insurance contracts, provisions,					
Course Learning	On succes	ssful completion of this	course, students should be able to:					
Outcomes	CLO 2 de	CLO 1 understand the general risks faced by organisations and individuals and the generic risk manager principle CLO 2 demonstrate knowledge and understanding of the underlying financial and legal principles of the insur						
	CLO 4 co	mpare and contrast diff	ferent types of commercial and perso	onal insurance products				
	CLO 5 pla	an for and arrange their	own personal insurance needs					
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2017 - 2018	course) or course) or (Not availa	· (STAT1602 and any l · STAT2901. able to Actuarial Science	,	601 or (STAT1603 and any	University level 2			
		sem Offer in 2018 - :		Examination	May			
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.      Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar							
	and some unfamiliar situations. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.							
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack							
			ibilities, logical and coherent thinking. Show d presentational skills are minimally effective of		knowledge to solve			
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	•	Details		No. of Hours			
& Learning Activities	Lectures				36			
	Tutorials				12			
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,3			
	Examinat	ion	One 2-hour written examination	75	CLO 1,2,3,4,5			
Required/recommended reading and online materials	Trieschma edition)	ann, J., Hoyt, R. E. ar	lanagement and Insurance (Pearson nd Sommer, D.: Risk Management					
Course Website	moodle.hk	ru.hk						

STAT3611	Computer-aided data analysis (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr E K F Lam, Statistics & Actuarial Science (hrntlkf@hku.hk)		
Teachers Involved			
Course Objectives	A wide range of statistical analyses and methods are presented using scientific studies. Measuring uncertainty, describing patterns of va several variables are essential aspects of scientific investigatic statistics. This computer-oriented but non-mathematical course devel statistics. The course makes extensive use of computers through the knowledge of a programming language is required.	riability and the inter-relat ons that require good un lops the important concepts	ionship between nderstanding of and methods of
Course Contents & Topics	Data exploration, formulation of testable hypotheses, the evaluation past experience.	of evidence and forecasting	g on the basis of
Course Learning	On successful completion of this course, students should be able to:		
Outcomes	CLO 1 summarize and describe the quantitative and qualitative data u	ising some simple statistica	l measures
	CLO 2 describe the patterns of variability and the inter-relationship variables	p between several continu	ious or discrete
	CLO 3 carry out simple statistical analyses based on some real life appropriate statistical inferences and make interpretations on t		potheses, make
Pre-requisites (and Co-requisites and Impermissible	Pass in BIOL2102 or (ECON1280 and any University level 2 course course) or (STAT1602 and any University level 2 course) or (STAT160 Not for students who have passed in or have already enrolled in an	3 and any University level 2	course); and

combinations)	STAT36	316					
Offer in 2017 - 2018	N C						
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familia and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	outcomes. Show evidence	incomplete command of knowledge and sk of some analytical and critical abilities and oderately effective organizational and present	logical thinking, and ability to a			
	D	Show evidence of some co	ited command of knowledge and skills requi herent and logical thinking, but with limited and his. Apply limited or barely effective organizations.	nalytical and critical abilities. Sho			
	Fail	Demonstrate little or no evi- of analytical and critical a	dence of command of knowledge and skills n bilities, logical and coherent thinking. Show I presentational skills are minimally effective of	equired for attaining the course very little or no ability to app			
Course Type	Lecture-	-based course	·				
Course Teaching	Activiti	es	Details		No. of Hours		
& Learning Activities	Lecture	s			36		
	Tutorial	s			12		
	Reading	g / Self study		100			
Assessment Methods and Weighting	Method	ds	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignr	nents	Coursework (assignments, practical work, and a term test)	40	CLO 1,2,3		
	Examin	ation	One 2-hour written examination	60	CLO 1,2,3		
Required/recommende reading and online materials	E. R. Ba J. E. Fre R. Hook D. G. K (Duxbur	abbie: The Practice of Soceund & G. A. Simon: Statiste: How to tell the liars from the liars fro	Introduction to Modern Business Statial Research (Wadsworth Pub. Co., stics - A First Course (Prentice Hall, m the Statisticians (Marcel Dekker) & K. E. Muller: Applied Regression)  D. Stephan: Statistics for Manager	Belmont, 7th edition) 7th edition) n Analysis and Other Mu	ıltivariable Methods		
Course Website	moodle.						
Additional Course Information	CogSc	or CompSc students havir	ng taken STAT1301 should obtain ar	pproval from the dept.			
	J. T. Mo M. R. M J. Neter P. Newb I. Olkin,	iddleton: Data Analysis U , W. Wasserman, & G. A. pold: Statistics for Busines	Statistics (Maxwell Macmillian, 5th ed sing Microsoft EXCEL 5.0 (Duxbury) Whitmore: Applied Statistics (Allyn a ss and Economics (Prentice-Hall, Into: Probability Models and Application	and Bacon) ernational Editions, 3rd ed	,		

STAT3612	Data min	ng (6 credits)		Academic Year	2017			
Offering Department	Statistics 8	Actuarial Science		Quota	50			
Course Co-ordinator	Dr A J Zha	g, Statistics & Actuarial Science	e (ajzhang@hku.hk)					
Teachers Involved	(Dr A J Zha	ng, Statistics & Actuarial Science	e)					
Course Objectives	such as fir the aim of usage of si spawned.	losion in information technolog ince, customer relations mana, reating new knowledge and fir itistical methodologies and deventistical methodologies acompre bis course provides a compre odels for data mining.	gement and medicine. The iding new relationships amorelopment of new ones. In the	challenge of understanding ong data attributes has led nis process, a new area cal	g these data with to the innovative led data mining is			
Course Contents & Topics	Data pre-p networks.	ocessing, classification and reg	ression trees, credit scoring	g, kNN classifier, cluster an	alysis and neura			
Course Learning	On succes	ful completion of this course, st	udents should be able to:					
Outcomes	CLO 1 implement data mining process summarized in the acronym SEMMA which stands for sampling, exploring, modifying, modeling, and assessing data							
	CLO 2 understand and apply a wide range of data mining techniques, and recognize their characteristics, strengths and weaknesses							
	CLO 3 be proficient with the leading data mining softwareSAS Enterprise Miner							
	CLO 4 identify and use appropriate data mining techniques for a data mining project, taking into account both the nature of the data to be mined and the goals of the user of the discovered knowledge							
	CLO 5 evaluate the quality of discovered knowledge, taking into account the requirements of the data mining task being solved and the goals of the user							
Pre-requisites (and Co-requisites and Impermissible combinations)		T2602 or (STAT1603 and any T3600 or STAT3907, or alread						
Offer in 2017 - 2018	Y 2nd	em Offer in 2018 - 2019 : Y		Examination	No Exam			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an earning outcomes. Show strong analyt o apply knowledge to a wide range or presentational skills.	ical and critical abilities and logica of complex, familiar and unfamilia	al thinking, with evidence of original resituations. Apply highly effective	al thought, and ability e organizational and			
	В	Demonstrate substantial command of a earning outcomes. Show evidence of a and some unfamiliar situations. Apply e	nalytical and critical abilities and lo	ogical thinking, and ability to apply				
	С	Demonstrate general but incomplete outcomes. Show evidence of some an amiliar situations. Apply moderately eff	alytical and critical abilities and lo	ogical thinking, and ability to appl				

	D Fail	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcor Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to a knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. I of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to so problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	octure-based course						
Course Teaching	Activities		Details			No. of Hours		
& Learning Activities	Lectures					36		
	Tutorials					12		
	Reading /	Self study				100		
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments				30	CLO 1,2,3,5		
	Project reports				30	CLO 1,2,3,4,5		
	Test				40	CLO 2,3		
Required/recommended reading and online materials	T. Hastie, Prediction M. Kantard A. Webb: S Shmueli, C Application J. Han & M	R. Tibshirani, & J. (Springer, New York, zic: Data Mining: Cor Statistical Pattern Rec G., Patel, N.R. & Br s in Microsoft Office It. Kamber: Data Minin	Friedeman: The Ele 2008, 2nd edition) icepts, Models, Methognition (Wiley, 2011 uce, P.C.: Data Mir Excel with XLMiner (Vig: Concepts and Tec	ements of Statist ods, and Algorith , 2nd edition) ning for Busines Wiley, 2010, 2nd chniques (Morgan	s intelligence: Concepts	s, Techniques, and		
Course Website	http://mood		•		3 ( -3),,			
Additional Course Information	Relationshi	rences: M. J. A. Berr ip Management (Wile T.: Data Mining: Meth	y, 2011, 3rd edition)	· ·	niques: For Marketing, S	Sales and Customer		

STAT3613	Marketin	ng engineering	(6 credits)		Academic Yea	ar 2017		
Offering Department	Statistics	50						
Course Co-ordinator	Dr C W K	Or C W Kwan, Statistics & Actuarial Science (cwkwan@hku.hk)						
Teachers Involved	(Dr C W K	(Dr C W Kwan, Statistics & Actuarial Science)						
Course Objectives	used in th and report including analysis.	This course is designed to provide an overview and practical application of trends, technology and methodology used in the marketing survey process including problem formulation, survey design, data collection and analysis, and report writing. Special emphasis will be put on statistical techniques particularly for analysing marketing data including market segmentation, market response models, consumer preference analysis and conjoint analysis. Students will analyse a variety of marketing case studies.						
Course Contents			, Market response models, Surve	•		for segmentation		
& Topics			oning, Statistical methods for new		esign			
Course Learning			this course, students should be at					
Outcomes			kills of curve fitting and analyzing d	ata with S	AS procedures or R pa	ckages		
			ng decision models					
	ar		analysis, factor analysis, multidime dels, confirmatory factor analysis, product design					
Pre-requisites (and Co-requisites and Impermissible combinations)	course) or	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901						
Offer in 2017 - 2018	Y 1st	sem Offer in 20	18 - 2019 : Y		Examination	Dec		
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cours learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilit to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cours learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familia and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.  D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.							
	Fail	knowledge to solve p Demonstrate little or of analytical and cr	ome coherent and logical thinking, but with I problems. Apply limited or barely effective or no evidence of command of knowledge an titical abilities, logical and coherent thinkir ion and presentational skills are minimally e	rganizationa d skills requ ng. Show ve	I and presentational skills. ired for attaining the course le ery little or no ability to app	earning outcomes. Lack		
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	3	Details			No. of Hours		
& Learning Activities	Lectures					36		
_	Tutorials					12		
	Reading /	Self study				100		
Assessment Methods and Weighting	Methods	•	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Coursework (assignments class test and a group proje		50	CLO 1,2,3		
	Examinat	ion	One 2-hour written examina	ation	50	CLO 1,2,3		
Required/recommended reading and online materials	Malhotra,	Naresh: Marketing	een P.E.: Analysing multivariate da g Research: An Applied Orientation plied Multivariate Statistical Analys	(Pearson	ı, 2010, 6th ed.)			

	Lilien G.L. and Rangaswamy A.: Marketing Engineering (Prentice Hall, 2003, 2nd ed.)
Course Website	moodle.hku.hk

STAT3614	Busines	s forecasting (6 cre	edits)	Academic Yea	r 2017			
Offering Department	Statistics &	istics & Actuarial Science Quota						
Course Co-ordinator	Dr R W L	R W L Wong, Statistics & Actuarial Science (rwong@hku.hk)						
Teachers Involved								
Course Objectives	individual forecasts	In daily business operations, forecasts are routinely required on different aspects of the economy, the market and individual companies. Numerous statistical techniques have been developed in the past decades to provide forecasts for the business decision-maker. This course considers a wide range of such techniques that have proven useful to practitioners. The course will involve the use of computer software, EXCEL, in the teaching process.						
Course Contents & Topics	averages	Review of basic statistical concepts; autocorrelation analysis; evaluation and combination of forecasts; moving averages and smoothing methods; simple linear regression; multiple regression; growth curves; time series regression; the handling of seasonal cycles; decomposition methods.						
Course Learning	On succes	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 un	nderstand data patterns	and choose a suitable forecasting to	chniques				
		nderstand forecasting methods, simple and mult	nethods: moving averages and smo tiple linear regression	othing methods, decompo	sition and winter's			
		evelop hands-on skills nctions	of analyzing business data with c	omputer software, EXCEL	., and its add-ins			
Pre-requisites (and Co-requisites and Impermissible combinations)	course) or Not for stu	ass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or (STAT1603 and any University level 2 course); and of the students who have passed or already enrolled in any of these courses: STAT2601, STAT2901, STAT3907, TAT4601, ECON2280.						
Offer in 2017 - 2018	N Offe	er in 2018 - 2019 : N		Examination				
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.							
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.							
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.							
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Lectures				36			
	Tutorials				12			
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	40	CLO 1			
	Examinat	ion	One 2-hour written examination	60	CLO 1,2,3			
Required/recommended reading and online materials	P. E. Ga Economic	ynor & R. C. Kirkpatr s (McGraw-Hill, 1994)	G. Reitsch: Business Forecasting (Frick: Introduction to Time-series My Business & Economic Forecasting	odelling and Forecasting				
		,	y business & Economic Forecasting	(117, 1994)				
Cource Wahaita		noodle.hku.hk						
Course Website Additional Course		lso available to CompSc students having taken STAT1301. Students should obtain approval from the course						

STAT3615	Practica	al math	ematics fo	or investn	nent (6 c	redits)		Academic Year	2017
Offering Department	Statistics 8	& Actuar	rial Science					Quota	
Course Co-ordinator	Dr A G Be	Benchimol	I, Statistics 8	& Actuarial S	Science (u	g_enquiry(	@saas.hku.hk)		
Teachers Involved	(Dr A G Be	Benchimo	ol,Statistics 8	& Actuarial	Science)				
Course Objectives			of this course considered.		n the cond	epts on fir	nancial mathem	atics. Practical app	olications of these
Course Contents & Topics	schedules	es and sir	•	yield rates	s; bonds a	nd related	,	nted cash flow ana tical applications si	,
Course Learning Outcomes	CLO 1 so	solve prac carry out o	discounted c	ms relating cash flow ar	to annuitie nalysis	s certain, s	simple and com	pound interest ems such as real es	tate mortgage
Pre-requisites (and Co-requisites and Impermissible combinations)	STAT2601	01 or (ST	AT1603 and	any Unive	rsity level	2 course) o	(STAT1602 and street (STAT2901; and street) and street (STAT2901; and street) and street (STAT2901) and street		evel 2 course) or
Offer in 2017 - 2018	Y 2nd	nd sem	Offer in 2018	8 - 2019 : Y	′			Examination	May
Grade Descriptors (A+ to F)	A							nd skills required for at g, with evidence of origin	

		to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organiz presentational skills.				
	В	learning outcomes. Show ev	mmand of a broad range of knowledge and ridence of analytical and critical abilities and ns. Apply effective organizational and prese	logical thinking, and ability to ap		
	С	Demonstrate general but in outcomes. Show evidence familiar situations. Apply mo				
	D	Show evidence of some coh	ted command of knowledge and skills requi lerent and logical thinking, but with limited a s. Apply limited or barely effective organizati	nalytical and critical abilities. Sh		
	Fail	Demonstrate little or no evic of analytical and critical at	lence of command of knowledge and skills r bilities, logical and coherent thinking. Show presentational skills are minimally effective	equired for attaining the course very little or no ability to ap		
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3	
	Examinat	ion	One 3-hour written examination	75	CLO 1,2,3	
Required/recommended reading and online materials		n, S. A.: Mathematics o	rest (Irwin: Illinois, 2008, 3rd edition of Investment and Credit (ACTEX F		Books: Connecticut,	
Course Website	moodle.hk	u.hk				

STAT3616	Advance	ed SAS programmi	ng (6 credits)	Academic Yea	r 2017		
Offering Department	Statistics	Statistics & Actuarial Science Quota 50					
Course Co-ordinator	TBC, Stat	TBC, Statistics & Actuarial Science ()					
Teachers Involved							
Course Objectives	This course aims to equip students, who have taken STAT2603, with a high level of proficiency in SAS						
	programming for automation of procedures and data processing in solving complex problems more efficiently.						
Course Contents & Topics	Overview of SAS underlying parts. Macro programming. Advanced programming techniques including data simulation, advanced data look-up techniques, modifying transaction datasets and controlling I/O processing and memory.						
Course Learning	On succes	ssful completion of this	course, students should be able to:				
Outcomes			of SAS and basic programming				
	CLO 2	Jse the BY statement for	or parallel processing to aid automat	on			
	CLO 3 U	Jse the output dataset	without printing to OUTPUT windows	for piping idea in automati	on		
	CLO 4	Jse SAS MACRO to de	velop customized and automated ap	plications			
	CLO 5 l	Jse advanced SAS pro	gramming statements and technique	s to solve complex problem	ıs		
Pre-requisites	Pass in S	TAT2601 or STAT2901					
(and Co-requisites and Impermissible combinations)	(Students	are strongly recommer	nded to take STAT2603 prior to takin	g this course.)			
Offer in 2017 - 2018	N Off	N Offer in 2018 - 2019 : Y Examination					
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Fail	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
and troigining							
and troighting	Assignme	ents	Coursework (assignments, tutorials, and a class test)	50	CLO 1,2,3,4,5		
and norghning	Assignme		(	50 50	CLO 1,2,3,4,5 CLO 1,2,3,4,5		

STAT3617	Sample survey methods (6 credits)	Academic Year	2017

	& Actuarial Science		Quota			
Ms O T K Choi, Statistics & Actuarial Science (ochoi@hku.hk)						
(Ms O T K Choi, Statistics & Actuarial Science) (Prof F W H Ho, Statistics & Actuarial Science)						
Survey de methods i	This course will cover design and implementation of sample surveys and analysis of statistical data thus obtained. Survey design includes overall survey design, design of sampling schemes and questionnaires, etc. Sampling methods include sample size determination, sampling and non-sampling errors and biases, methods of estimation of parameters from survey data. Imputation for missing data at					
			v and ethics implemen	tation matters like		
managem random sa determina responses private se	nanagement of survey staff, respondent relationship and logistical issues; and sampling methods like simple andom sampling, systematic sampling, stratified sampling, cluster sampling, multi-stage sampling, sample size letermination, post-stratification, ratio and regression estimation methods, non-sampling errors and biases, non-esponses and missing data. Case studies of major applications of sample survey methods in the public and vivate sectors, with some examples on the analysis and application of the statistical data thus produced, will be					
On succes	ssful completion of this o	ourse, students should be able to:				
	•	ğ .	s steps to be taken in	the planning and		
su	ırvey - make statistical in	ference on parameters based on a	sample	ption for a particular		
	<u> </u>	. , , , , , , , , , , , , , , , , , , ,		CTAT1601 and an		
University	Pass or already enrolled in BIOL2102, or (ECON1280 and any University level 2 course), or (STAT1601 and an University level 2 course), or (STAT1602 and any University level 2 course), or STAT2601, or (STAT1603 and an University level 2 course), or STAT2901.					
Y 2nd	I sem Offer in 2018 - 20	019 : Y	Examination	May		
A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
Fail	of analytical and critical ab problems. Organization and	I abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to				
	<b>S</b>	Details		No. of Hours		
				36		
	Colfotudu			12		
	Seit Study	Detelle	14/-:	100		
Wethods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3		
Examination One 2-hour written examination 75						
Examination One 2-hour written examination 75 CLO 1,2,3  S. L. Lohr: Sampling: Design and Analysis, 2nd edition (Duxbury Press, 2010)  R. L. Scheaffer, W. Mendenhall, & R. L. Ott: Elementary Survey Sampling (Duxbury Press, 2011, 7th edition)  W. G. Cochran: Sampling Techniques (John Wiley & Sons Ltd., 1997)  R. M. Groves, F. J. Fowler, M. P. Couper, J. M. Lepkowski, E. Singer, R. Tourangeau: Survey Methodology (John Wiley & Sons Ltd., 2009, 2nd edition)  L. Kish: Survey Sampling (John Wiley & Sons, Inc., 1995)  P. Salant & D. A. Dillman: How to Conduct Your Own Survey (John Wiley & Sons, Inc., 1994)						
R. M. Gro Wiley & So L. Kish: So	ves, F. J. Fowler, M. P. ons Ltd., 2009, 2nd editio urvey Sampling (John W	Couper, J. M. Lepkowski, E. Singe on) iley & Sons, Inc., 1995)	r, R. Tourangeau: Survey	Methodology (Johi		
	(Ms O T K (Prof F W This cours Survey de methods i of parame Topics m managem random s determina responses grivate se discussed On succes CLO 1 de im CLO 2 de su CLO 3 ju Pass or a University University Y 2nd A  B C D Fail Lecture-ba Activities Lectures Tutorials Reading M Methods  Examinat	(Ms O T K Choi, Statistics & Actuar (Prof F W H Ho, Statistics & Actuar This course will cover design and Survey design includes overall st methods include sample size dete of parameters from survey data, in Topics may include: survey desmanagement of survey staff, resprandom sampling, systematic sandetermination, post-stratification, responses and missing data. Casprivate sectors, with some examp discussed.  On successful completion of this of CLO 1 demonstrate knowledge implementation of sample CLO 2 design different sample so survey - make statistical in CLO 3 judge whether the statistics Pass or already enrolled in BIOL2 University level 2 course), or STAT University level 2 course), or STAT University level 2 course), or STAT Demonstrate thorough mast learning outcomes. Show streaming outcomes. Show even and some unfamiliar situation.  C Demonstrate general but in outcomes. Show evidence of familiar situations. Apply more problems. Organization and problems. Organization and Lecture-based course.  Activities  Lectures  Tutorials  Reading / Self study  Methods	(Ms O T K Choi, Statistics & Actuarial Science) (Prof F W H Ho, Statistics & Actuarial Science) This course will cover design and implementation of sample surveys design includes overall survey design, design of sampling methods include sample size determination, sampling and non-samp of parameters from survey data, imputation for missing data etc. Topics may include: survey design and planning; survey qualit management of survey staff, respondent relationship and logistical random sampling, systematic sampling, stratified sampling, cluster determination, post-stratification, ratio and regression estimation me responses and missing data. Case studies of major applications or private sectors, with some examples on the analysis and application discussed.  On successful completion of this course, students should be able to: CLO1 demonstrate knowledge and understanding of the various implementation of sample surveys  CLO2 design different sample schemes and select the most efficient survey - make statistical inference on parameters based on a cloud supplementation of sample surveys.  Pass or already enrolled in BIOL2102, or (ECON1280 and any University level 2 course), or STAT1602 and any University level 2 course), or STAT2901.  Y 2nd sem Offer in 2018 - 2019: Y  A Demonstrate thorough mastery at an advanced level of extensive known in the survey and selection of the survey and selection of the survey and selection of the survey and and some unfamiliar situations. Apply effective organizational and presence of analytical and critical abilities and logic to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.  B Demonstrate general but incomplete command of knowledge and familiar situations. Apply moderately effective organizational and presence of some analytical and critical abilities and contical abilities of analytical and critical abilities and continual presence of some content and	(Mro T K Choi, Statistics & Actuarial Science) (Prof F W H Ho, Statistics & Actuarial Science) This course will cover design and implementation of sample surveys and analysis of statistica Survey design includes overall survey design, design of sampling schemes and questionna methods include sample size determination, sampling and non-sampling errors and biases, mor parameters from survey data, imputation for missing data etc.  Topics may include: survey design and planning; survey quality and ethics; implemen anagement of survey staff, respondent relationship and logistical issues; and sampling random sampling, systematic sampling, stratified sampling, cluster sampling, multi-stage sat determination, post-stratification, ratio and regression estimation methods, non-sampling errosponses and missing data. Case studies of major applications of sample survey method private sectors, with some examples on the analysis and application of the statistical data th discussed.  On successful completion of this course, students should be able to:  CLO 1 demonstrate knowledge and understanding of the various steps to be taken in implementation of sample surveys.  CLO 2 design different sample schemes and select the most efficient and suitable one for ado survey - make statistical inference on parameters based on a sample  CLO 3 judge whether the statistics presented by other survey takers are trustworthy  Pass or already enrolled in BIOL2102, or (ECON1280 and any University level 2 course), or STAT2601, or University level 2 course), or STAT2901.  Y 2nd sem Offer in 2018 - 2019 : Y  Examination  A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of or to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply inhibited or opanylacial and presentational skills.  D Demonstrate partial but limited command of a broad range of knowledge and skills requi		

STAT3618	Derivatives and risk management (6 credits)	Academic Year	2017			
Offering Department	Statistics & Actuarial Science	Quota				
Course Co-ordinator	Dr R W L Wong, Statistics & Actuarial Science (rwong@hku.hk)					
Teachers Involved	(Dr R W L Wong, Statistics & Actuarial Science)					
Course Objectives	Nowadays all risk managers must be well versed in the use and valuation of derivatives. The two basic types of derivatives are forwards (having a linear payoff) and options (having a non-linear payoff). All other derivatives can be decomposed to these underlying payoffs or alternatively they are variations on these basic ideas. This course aims at demonstrating the practical use of financial derivatives in risk management. Emphases are on pricing and hedging strategies, and the concept of no-arbitrage.					
Course Contents & Topics	Review of futures, forwards and options and the concept of no arbitrage; hedging strategies using futures; pricing of forwards and futures; interest rate futures and swaps; trading strategies using options; put-call parity; valuation of European and American options using the binomial-tree model; valuation of European and American options using the Black-Scholes option pricing model; the Greeks: their calculation and interpretation; implied volatility; delta hedging and the role of market-makers; exotic options: Asian options, barrier options, compound options, gap options and exchange options.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 use futures, forwards, options and swaps to formulate financial strategies					
	CLO 2 determine the payoff and the value of various derivative products using binomial tree and Black-Sholes formula					
	CLO 3 explain how derivative products can be used as tools to manage financial risk					
	CLO 4 recognize how to decompose complicated derivatives into a portfolio of standard derivatives					

Pre-requisites (and Co-requisites and Impermissible combinations)	Not for stu Not for stu	idents who have passed	I in STAT3910, or have already enr I in STAT3905, or have already enr I in FINA2322, or have already enro	olled in this course; and			
0" : 0047 0040		Sc(Actuarial Science) stu			D		
Offer in 2017 - 2018		sem Offer in 2018 - 20	* . *	Examination	Dec		
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	tery at an advanced level of extensive kn trong analytical and critical abilities and logi ide range of complex, familiar and unfami	cal thinking, with evidence of ori	ginal thought, and ability		
	В	learning outcomes. Show ev	mmand of a broad range of knowledge and ridence of analytical and critical abilities and ans. Apply effective organizational and prese	logical thinking, and ability to ap			
	С	outcomes. Show evidence	ncomplete command of knowledge and si of some analytical and critical abilities and derately effective organizational and preser	logical thinking, and ability to a			
	D						
	Fail						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,3		
	Examinat	ion	One 2-hour written examination	75	CLO 1,2,3,4		
Required/recommended reading and online materials	Hull, J. C.: Options, Futures, and Other Derivatives (Prentice Hall, 2009, 7th edition), Chapters 3, 5-7, 9-11, 13, 17 18, 24.  McDonald, R. L.: Derivatives Markets (Addison Wesley, 2006, 2nd edition), Chapters 1-2, 4-5, 7-14, 23.  Hull, J.C.: Risk Management and Financial Institutions (Pearson Higher Education, 2010, 2nd edition)						
Course Website	moodle.hk	moodle.hku.hk					

STAT3620	Modern	nonparametric stat	istics (6 credits)	Academic Year	2017			
Offering Department	Statistics & Actuarial Science Quota							
Course Co-ordinator	Dr P L H	Yu, Statistics & Actuaria	I Science (plhyu@hku.hk)					
Teachers Involved	(Dr P L H	(Dr P L H Yu, Department of Statistics and Actuarial Science)						
Course Objectives		se aims to acquaint stu netric statistical methods	dents with the fundamentals, basi for data analysis.	c properties and use of clas	ssical and moder			
Course Contents & Topics	samples;	Topics may include: order-statistics; goodness-of-fit tests; rank tests for single-sample and two-independent samples; tests for designed experiments; permutation tests; tests for trends and association; jackknife and bootstrapping methods; nonparametric regression.						
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 ic	dentify appropriate nonpa	arametric methods for analyzing da	ta				
	CLO 2 p	erform a variety of nonpa	arametric statistical analyses					
		ain a working proficiend onparametric statistical a	ey in the use of statistical software analyses	e for data management and	performing basic			
	CLO 4 e	ffectively communicate f	indings and conclusions					
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in S	Pass in STAT2602 or STAT3902						
Offer in 2017 - 2018	Y 1s	t sem Offer in 2018 - 2	019 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.							
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.							
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.							
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail	of analytical and critical a	dence of command of knowledge and skills bilities, logical and coherent thinking. Sho I presentational skills are minimally effective	ow very little or no ability to apply				
Course Type	Lecture-based course							
Course Teaching	Activities Details		No. of Hours					
& Learning Activities	Lectures				36			
	Tutorials				12			
	Reading / Self study			100				
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Assignm	ents	Coursework (assignments, tutorials and a class test)	25	CLO 1,2,3,4			

	Examination	One 2-hour written examination	75	CLO 1,2,3
Required/recommended	Higgins, James: Introduction to M	odern Nonparametric Statistics (Dux	bury Press, 2004)	
reading and	Hollander, M. and Wolfe, D.A.: Nonparametric Statistical Methods, 2nd edition (Wiley, 1999)			
online materials	Gibbons, J.D. and Chakraborti, S.: Nonparametric Statistical Inference, 5th edition (CRC press, 2010)			
	Kvam, P.H. and Vidakovic, B.: N	Nonparametric Statistics with Applic	cations to Science and E	ngineering. (Wiley,
	2007)			
Course Website	moodle.hku.hk			

STAT3621	Statistic	al data analysis (6	credits)	Academic Yea	<b>r</b> 2017	
Offering Department	Statistics 8	50				
Course Co-ordinator	Dr S K C Cheung, Statistics & Actuarial Science (simonkc@hku.hk)					
Teachers Involved	(Dr S K C Cheung, Statistics & Actuarial Science)					
Course Objectives	Building on prior coursework in statistical methods and modeling, students will get a deeper understanding of the entire process of data analysis. The course aims to develop skills of model selection and hypotheses formulation so that questions of interest can be properly formulated and answered. An important element deals with mode review and improvement, when one's first attempt does not adequately fit the data. Students will learn how to explore the data, to build reliable models, and to communicate the results of data analysis to a variety of					
	audiences					
Course Contents & Topics	Descriptive statistics, presentation and visualization of data; Simple statistical analyses for the one-sample and two sample case using parametric and nonparametric methods; Regression analyses: model fitting; variable selection and model diagnostic checking; Analysis of Variance (ANOVA): 1-way, two-way and higher-way ANOVA; Covariance analysis; Categorical and count data: binary logistic regression, Poisson regression.  Real data sets will be presented for modelling and analysis using statistical software for gaining hands-on experience.					
Course Learning			course, students should be able to:			
Outcomes		•	problem and identify what to measu		st .	
	CLO 2 su		e the quantitative and qualitative de			
	CLO 3 ide	entify the association a	mong several continuous or discrete	e variables		
	CLO 4 carry out appropriate and comprehensive statistical analyses based on rea selection, perform model diagnostics, formulate testable hypotheses, mainferences, make interpretations on the findings and report writing					
Pre-requisites	Pass in S1	TAT3600 or STAT3907				
(and Co-requisites and Impermissible combinations)	(Students are strongly recommended to take STAT2603 prior to taking this course.)					
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 -	2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.      Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.					
	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	of analytical and critical	evidence of command of knowledge and skills required for attaining the course learning outcomes. I al abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to sand presentational skills are minimally effective or ineffective.			
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework (assignments and a class test)	50	CLO 1,2,3,4	
	Examination One 3-hour written examination 50 CLO 1,2,3,4					
Required/recommended reading and online materials	Ramsey, F. and Schafer, D. (2012). The Statistical Sleuth: A Course in Methods of Data Analysis, 3rd edition Cengage Learning. Cody, R. (2011). SAS Statistics by Example. SAS Institute. Cody, R.P. & Smith, J.K. (2005). Applied Statistics and the SAS Programming Language, 5th edition, Pearson. Elliott, R.J. (2009). Learning SAS in the Computer Lab, 3rd edition, Cengage Learning. Kleinbaum, D.G., Kupper, L.L., Nizam, A. and Muller, K.E. (2007). Applied Regression Analysis and Other Multivariable Methods. 4th edition, Cengage Learning.					

STAT3622	Data visualization (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	50
Course Co-ordinator	Dr A J Zhang, Statistics & Actuarial Science (ajzhang@hku.hk)		
Teachers Involved	(Dr A J Zhang, Statistics & Actuarial Science)		
Course Objectives	This course will focus on how to work with statistical graphics, graphics that disp and analyze data. Students will learn a set of tools such as R to create these gra		
Course Contents	Grammar of graphics, visualizing patterns over time, visualizing relationship	, visualizing spat	ial relationships,

& Topics	visualizing	g texts.					
Course Learning	On succe	ssful completion of this	course, students should be able to:				
Outcomes	CLO 1	choose the best ch	art that fits the data				
	CLO 2	create a compelling	visualization using computer softw	are			
	CLO 3		tively using statistical graphics				
	CLO 4		raphics and suggest improvements				
Pre-requisites	Pass in S	TAT2602 or STAT3902					
(and Co-requisites and Impermissible combinations)							
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2	2019 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	learning outcomes. Show	istery at an advanced level of extensive k strong analytical and critical abilities and log wide range of complex, familiar and unfam	ical thinking, with evidence of or	riginal thought, and ability		
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no ev of analytical and critical	idence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	required for attaining the course ow very little or no ability to a			
Course Type	Lecture-b	ased course					
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures				36		
•	Tutorials				12		
		/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Presenta	tion	oral presentation and in-class discussion	40	CLO 1,2,3,4		
	Project re	ports	written report	60	CLO 1,2,3,4		
Required/recommended reading and online materials	Tufle, Edv Chang, W Murray, D	i, Nathan (2011). Visualize This: The FlowingData Guide to Design, Visualization, and Statistics. Wiley. le, Edwards R. (2001). The Visual Display of Quantitative Information. 2nd edition, Graphics Press. ang, Winston (2013). R Graphics Cookbook. O Reilly Media. rray, Dan (2013). Tableau Your Data!: Fast and Easy Visual Analysis with Tableau Software. Wiley. g, Ritchie, S. (2014). Visual Storytelling with D3: An Introduction to Data Visualization in JavaScript. Addison					
Course Website	moodle.hl	ku.hk					

STAT3799	Directe	d studies in statistics (6 credits)	Academic Year	2017			
Offering Department	Statistics	s & Actuarial Science	Quota	30			
Course Co-ordinator	Prof S M	S Lee, Statistics & Actuarial Science (smslee@hku.hk)					
Teachers Involved	(Various	teachers as the assessors of oral presentations and writte	en reports, Statistics & Actuarial	Science)			
Course Objectives	To enhar	nce students' knowledge of a particular topic and students	' self-directed learning and critic	al thinking skills.			
Course Contents & Topics	topic is p	The student undertakes a self-managed study on a topic in statistics under the supervision of a staff member. The topic is preferably one not sufficiently covered in the regular curriculum. The directed study can be a critical review or a synthesis of published work on the subject, or a laboratory or field study that would enhance students' understanding of the subject. The project may not require an element of originality.					
Course Learning	On succe	essful completion of this course, students should be able t	0:				
Outcomes	CLO 1 g	gain first-hand experience in solving a research or applied	problem in statistics or related a	areas			
		CLO 2 develop skills in important technical tools, including the use of computer software or programs, for typical statistical research and data analyses					
	CLO 3 w	vrite succinct reports on the findings of a research study					
	CLO 4 n	make concise oral presentation of the findings of a researc	ch study				
(and Co-requisites and Impermissible combinations)	This cap	ment/Statistics Majors; and Not for students who have alre stone course is only for students majoring in Decision Al nsent of course coordinator. This course is mutually exclu lest that a student is allowed to take this capstone course	nalytics/Risk Management/Stati sive with STAT4710.				
Offer in 2017 - 2018	Y 1s	st sem 2nd sem Offer in 2018 - 2019 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject. Show strong analytical original thought. Insightful use and critical analysis / evaluation of into quote/reference aptly. Critical use of data and results to draw a organizational and presentational skills. [Work of A+ should show careas relevant to the topic.]	formation drawn from a full range of hig ppropriate and insightful conclusions. A	h quality sources and Apply highly effective			
	В	' '					
	С	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited grasp, with retention of some relevar logical thinking, but with limited analytical and critical abilities. Den through summary rather than analysis and comparison. Limited abi Apply limited or barely effective organizational and presentational sk	nonstrate use and reference of several lity to use data and results to draw app	I sources, but mainly			
	Fail	Demonstrate evidence of little or no grasp of the knowledge and analytical and critical abilities, logical and coherent thinking. Limite					

	them. Misuse of da minimally effective o	ta and results and/or unable to draw appropriate r ineffective.	e conclusions. Organization and	presentational skills are			
Course Type	Project-based course						
Course Teaching	Activities	Activities Details					
& Learning Activities	Reading / Self study	discussion & meetings to be an the supervisor	discussion & meetings to be arranged by the student & the supervisor				
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Oral presentation	oral presentation & in-class discussion	40	CLO 1,2,4			
	Research report	written report	60	CLO 1,2,3			
Course Website	moodle.hku.hk						

STAT3901	Life con	tingencies (6 credi	ts)	Academic Yea	r 2017		
Offering Department	Statistics 8	& Actuarial Science	•	Quota			
Course Co-ordinator	Prof K C Y	uen, Statistics & Actua	rial Science (kcyuen@hku.hk)	'			
Teachers Involved	(Prof K C	Yuen, Statistics & Actua	arial Science)				
Course Objectives	until-death financial in	The major objectives of this course are to integrate life contingencies into a full probabilistic framework. The time until-death random variable is the basic building block by which models for life insurances, designed to reduce the financial impact of the random event of untimely death, are developed. This course introduces the concepts of life contingencies and the basic mathematical skills for modelling life insurance products.					
Course Contents	Key topics	include: survival distri	butions; life table functions; select	and ultimate tables; life ins	urance models; life		
& Topics			dom variable; benefit premiums.				
Course Learning		•	course, students should be able to:				
Outcomes	CLO 2 de va	fine the continuous suriable using some assu	alues, variances, probabilities, and purvival-time random variable that a imptions for fractional ages enefit random variables defined on	rises from the discrete sur	vival-time random		
	va	riables, present-value-	expected values, variances and pro of-loss-at-issue random variables, a ns for life insurances and annuities				
Pre-requisites		TAT2602 and STAT36					
(and Co-requisites and Impermissible combinations)	(Pass in S		STAT3902 or already enrolled in th	is course)) or			
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 2	2019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5		
	Examinati	ion	One 3-hour written examination	75	CLO 1,2,3,4,5		
		tutorials, and a class test)					
Required/recommended reading and online materials	Itasca, Illin Dickson, (	nois: The Society of Act	tuaries and Waters, H.R.: Actuarial Mathe		,		

STAT3902	Statistical models (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr G C S Lui, Statistics & Actuarial Science (csglui@hku.hk)		
Teachers Involved	(Dr G C S Lui, Statistics & Actuarial Science)		
Course Objectives	This course is on the basis of 'STAT2901 Probability and Statistics: Foundation study the concepts and methods of statistics. The course will lay emphasis testing, the two major areas of statistical inference. Through the study of this couboth quantitative skills and qualitative perceptions essential for making rigorous	on the estimation urse, students will	and hypothesis be equipped with
Course Contents & Topics	Distribution and density of function of random variables; Order statistics, central estimator (MLE), moment estimator, Bayesian estimator, properties of estim Confidence interval estimations for normal mean, the difference of two normal means are confidence interval.	ators, limiting pro	perties of MLE;

Course Learning C		and goodness of fit t				
		stul completion of th	nis course, students should be able to:			
		derstand the importa	ance of sufficient statistic(s) in data redu interval estimation, and testing hypothe		rences such as point	
	CLO 2 dei	rive maximum likelih	good estimators of parameters to calcula	ate maximum likelihood e	stimates	
	CLO 3 loc	ate pivotal quantity	to construct confidence intervals of para	ameters		
			test hypotheses associated with one-sa s and non-normal distributions with larg		normal distributions	
Pre-requisites	Pass in ST	AT2901; and				
		ot for students who have passed in STAT2602, or already enrolled in this course; and or BSc(Actuarial Science) students only.				
Offer in 2017 - 2018 Y	Y 1st s	sem Offer in 2018	- 2019 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	learning outcomes. Sho to apply knowledge to presentational skills.	mastery at an advanced level of extensive know strong analytical and critical abilities and logic a wide range of complex, familiar and unfamili	al thinking, with evidence of or ar situations. Apply highly effe	iginal thought, and ability ective organizational and	
E	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
ī	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
F	Fail	of analytical and critic	evidence of command of knowledge and skills real abilities, logical and coherent thinking. Show and presentational skills are minimally effective of	very little or no ability to ap		
71.	_ecture-ba	sed course				
	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
F	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
1	Assignme	nts	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4	
	Examination		One 3-hour written examination	75	CLO 1,2,3,4	
reading and 2 conline materials H e A L	2004, 7th e Hogg R. V edition) Arnold S. F	edition) ., McKean J. W. & 0 F.: Mathematical Sta J. and Marx M. L.: /	Freund's Mathematical Statistics with A Craig A. T.: Introduction to Mathematica tistics (Prentice-Hall, 1990) An Introduction to Mathematical Statisti	al Statistics (Pearson Pre	entice Hall, 2005, 6th	
	noodle.hki					

STAT3903	Stochas	tic models (6 credits)	Academic Year	2017				
Offering Department	Statistics	& Actuarial Science	Quota					
Course Co-ordinator	Prof J J F	Yao, Statistics & Actuarial Science (jeffyao@hku.hk)						
Teachers Involved	(Prof J J F	Yao, Statistics & Actuarial Science)						
Course Objectives		This is an introductory course in probability modelling. A range of important topics in stochastic processes will be discussed.						
Course Contents & Topics	classificati states, Po Brownian formula, C	Introduction to probability theory, Conditional probability and expectation, Markov chains, random walk models, classification of states in a Markov chain, calculation of limiting probabilities and mean time spent in transient states, Poisson process, distribution of inter-arrival time and waiting time, conditional distribution of the arrival time, Brownian Motion, hitting time and maximum variable, geometric Brownian motion, the Black-Scholes option pricing formula, Gaussian bridge, and stationary processes. Birth-and-death process, branching process and renewal process may also be covered (if time permits).						
Course Learning	On succes	ssful completion of this course, students should be able to:						
Outcomes	CLO 1	apply the conditioning method to calculate the mean and probabili	ty					
	CLO 2 understand the essentials of Markov chains, the Poisson process, and Brownian motion							
	CLO 3	understand how stochastic models can be applied to the study of	real-life phenomena					
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for stu Not for stu	TAT2901; and idents who have passed in MATH3603, or have already enrolled in idents who have passed in STAT3603, or have already enrolled in idents who have passed in STAT3603, or have already enrolled in idential Science) students only.	,					
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2019 : Y	Examination	May				
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thint to apply knowledge to a wide range of complex, familiar and unfamiliar situresentational skills.	king, with evidence of origin ations. Apply highly effective	al thought, and ability e organizational and				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete command of knowledge and skills requoted outcomes. Show evidence of some analytical and critical abilities and logical familiar situations. Apply moderately effective organizational and presentational	thinking, and ability to appl					
	D	Demonstrate partial but limited command of knowledge and skills required for Show evidence of some coherent and logical thinking, but with limited analytica knowledge to solve problems. Apply limited or barely effective organizational an	l and critical abilities. Show					
	Fail	Demonstrate little or no evidence of command of knowledge and skills required	I for attaining the course lea	rning outcomes. Lack				

		ritical abilities, logical and coherent thinking. Show tion and presentational skills are minimally effective o		pply knowledge to solve
Course Type	Lecture-based course			
Course Teaching & Learning Activities	Activities	Details		No. of Hours
	Lectures			36
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3
	Examination	One 3-hour written examination	75	CLO 1,2,3
Required/recommended reading and online materials	S. M. Ross: Introduction to	Probability Models (9th edition)		
Course Website	moodle.hku.hk			

STAT3904	Corpor	ate finance for a	ctuarial science (6 credits)	Academic Yea	ar 2017	
Offering Department	Statistics	& Actuarial Science	<b>)</b>	Quota		
Course Co-ordinator	Dr D Lee	e, Statistics & Actuar	ial Science (leedav@hku.hk)			
Teachers Involved		e,Statistics & Actuar	,			
Course Objectives		•	ctuarial science students to receive VEE-	•	,	
		de students with a	is to introduce students to the fundament systematic framework within which to eva			
Course Contents & Topics	covered present vand Blac corporate efficiency	The first part of the course will give an introduction to corporate finance and provide an overview of some topics covered in STAT2902 and STAT3615. These include: financial markets and companies; present value and net present value, financial instruments and dividends derivatives market, no-arbitrage pricing theory, binomial mode and Black-Scholes option pricing formula. The main part of the course will focus on some important topics of corporate finance including: capital structure and dividend policy, financial leverage and firm value, market efficiency, risk and return, investment decision using Markowitz mean variance analysis, CAPM, long term inancing, measures and performance assessment of financial performance using various measures.				
Course Learning			this course, students should be able to:	<b></b>		
Outcomes		CLO 1 understand the factors to be considered by a company when deciding on its capital structure and of policy, and also the impact of financial leverage and long/short term financing policies on capital structure.				
		calculate the value of		t term intarioning policies of	Toupital Structure	
			ormance using various measures			
			n-variance portfolio theory			
Pre-requisites (and Co-requisites and Impermissible combinations)			AT2902) or (Pass in STAT3610 and STA assed in FINA1310, or have already enrol			
Offer in 2017 - 2018	Y 2n	nd sem Offer in 20	18 - 2019 : Y	Examination	May	
Grade Descriptors	Α		h mastery at an advanced level of extensive kno			
(A+ to F)	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
		problems. Organization	on and presentational skills are minimally effective of	or ineffective.		
	Lecture-l	problems. Organization	on and presentational skills are minimally effective o	or ineffective.		
Course Teaching	Lecture-l	based course	on and presentational skills are minimally effective of Details	or ineffective.	No. of Hours	
Course Teaching	<b>Activitie</b> Lectures	pased course es		or ineffective.	36	
Course Teaching	Activities Lectures Tutorials	pased course es s		or ineffective.	36 12	
Course Teaching & Learning Activities	Activities Lectures Tutorials	pased course es		or ineffective.	36	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials	pased course es s s y / Self study		Weighting in final course grade (%)	36 12	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading	pased course ps s s s y / Self study s	Details  Details  Coursework (assignments,	Weighting in final	36 12 100 Assessment Methods	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Activitie Lectures Tutorials Reading Method	pased course es 6 6 7 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Details  Details	Weighting in final course grade (%)	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Tutorials Reading Methods Assignm Examina Brealey I Ross, S.	pased course ps s s s // Self study s ments ation R. A., Myers S. C. a	Details  Details  Coursework (assignments, tutorials, and a class test) One 3-hour written examination and Allen, F.: Principles of Corporate Finar V. and Jaffe, J.: Corporate Finance (2005)	Weighting in final course grade (%)  25  75 nce (2011, 10th edition)	36 12 100 Assessment Methods to CLO Mapping	

STAT3905	Introduction to financial derivatives (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr K C Cheung, Statistics & Actuarial Science (kccg@hku.hk)		
Teachers Involved	(Dr K C Cheung, Statistics & Actuarial Science)		
Course Objectives	This course aims at providing an understanding of the fundamental concepts	of financial deriva	tives. Emphases

A A			jing strategies, and the concept of no-arl			
Course Contents & Topics			ward contracts; call options; put option nd futures; commodity swaps; interest ra		preads and collars;	
Course Learning			his course, students should be able to:	to orrapo, put our parity.		
Outcomes			the definitions of terms commonly used	in derivatives markets		
			,		ontions and swans	
		CLO 2 evaluate the payoff and profit of basic derivative contracts, including forwards, futures, options, and swaps CLO 3 explain how derivative securities can be used as tools to manage financial risk				
Pre-requisites		STAT2902: and		-9		
and Co-requisites			ssed in STAT3618, or have already enro	olled in this course; and		
and Impermissible	Not for s	Not for students who have passed in FINA2322, or have already enrolled in this course; and				
combinations)	For BSc	c(Actuarial Science) st	udents only.			
Offer in 2017 - 2018	Y 19	st sem Offer in 2018	3 - 2019 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	learning outcomes. Sh to apply knowledge to presentational skills.	n mastery at an advanced level of extensive knows strong analytical and critical abilities and logic or a wide range of complex, familiar and unfamilion.	cal thinking, with evidence of order situations. Apply highly effe	iginal thought, and ability ective organizational and	
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familia and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Show evidence of som	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.			
	Fail	of analytical and criti-	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show n and presentational skills are minimally effective of	very little or no ability to ap	learning outcomes. Lack	
		problems. Organizatio	n and presentational skills are minimally effective t	or ineffective.		
Course Type	Lecture-	-based course	if and presentational skills are minimally effective c	or ineffective.		
71	Lecture-	-based course	Details	or ineffective.		
Course Teaching		-based course ies		or ineffective.	ply knowledge to solve	
Course Teaching	Activiti	-based course ies es		or ineffective.	No. of Hours	
Course Teaching	Activiti Lecture Tutorial	-based course ies es		or ineffective.	No. of Hours	
Course Teaching & Learning Activities Assessment Methods	Activiti Lecture Tutorial	-based course ies es ls g / Self study		Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Activiti Lecture Tutorial Reading	-based course ies es ls g / Self study ds	Details	Weighting in final	No. of Hours 36 12 100 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Activiti Lecture Tutorial Reading Method	-based course ies is is g / Self study ds	Details  Details  Coursework (assignments,	Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping	
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Activiti Lecture Tutorial Reading Method	-based course ies is is g / Self study ds ments nation	Details  Details  Coursework (assignments, tutorials, and a class test)	Weighting in final course grade (%)  25  75	No. of Hours 36 12 100 Assessment Methods to CLO 1,2,3	

STAT3906	Risk th	neory I (6 credits)		Academic Year	2017	
Offering Department	Statistic	s & Actuarial Science		Quota		
Course Co-ordinator	Dr K C (	Cheung, Statistics & Actua	arial Science (kccg@hku.hk)			
Teachers Involved	(Dr K C	Cheung, Statistics & Actua	arial Science)			
Course Objectives			pics in actuarial science. Risk theory is problems such as the premium calcula		stical models an	
Course Contents & Topics	Severity	models; frequency mode	ls; collective risk models; coverage mod	difications; risk measures;	; simulation.	
Course Learning	On successful completion of this course, students should be able to:					
Outcomes		understand the individual expectation of the total cla	al risk model and the collective risk aim amounts	model, evaluate the	distribution and	
		estimate the premium of amounts made in previous	a policyholder and the total claim am s years	ounts using the informat	tion of the claim	
	CLO 3	calculate some commonly	used risk measures and explain their ι	use and limitation		
	CLO 4	apply simulation methods	within the context of actuarial models			
(and Co-requisites and Impermissible combinations)		MATH3603 or STAT3603				
Offer in 2017 - 2018		nd sem Offer in 2018 - 2		Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
(AT to F)		to apply knowledge to a w		ituations. Apply highly effective		
(AT IO F)	В	to apply knowledge to a w presentational skills. Demonstrate substantial co learning outcomes. Show ev		lls required for attaining at leas cal thinking, and ability to apply	e organizational and	
(AT IO F)	В	to apply knowledge to a w presentational skills. Demonstrate substantial co learning outcomes. Show evand some unfamiliar situation Demonstrate general but i outcomes. Show evidence	ride range of complex, familiar and unfamiliar sommand of a broad range of knowledge and skill vidence of analytical and critical abilities and logic	Ils required for attaining at leas cal thinking, and ability to apply onal skills. required for attaining most of cal thinking, and ability to apply	e organizational and it most of the course knowledge to familia the course learning	
(AT IO F)		to apply knowledge to a w presentational skills. Demonstrate substantial co learning outcomes. Show evand some unfamiliar situatic Demonstrate general but i outcomes. Show evidence familiar situations. Apply mc Demonstrate partial but lim Show evidence of some col	ride range of complex, familiar and unfamiliar sommand of a broad range of knowledge and skil vidence of analytical and critical abilities and logicons. Apply effective organizational and presentation complete command of knowledge and skills of some analytical and critical abilities and logic	lls required for attaining at leas cal thinking, and ability to apply onal skills. required for attaining most of cal thinking, and ability to apply nal skills. for attaining some of the course ical and critical abilities. Show I	e organizational and it most of the course knowledge to familia the course learning y knowledge to mos e learning outcomes	
(A+10 F)	С	to apply knowledge to a w presentational skills. Demonstrate substantial co learning outcomes. Show evand some unfamiliar situatic Demonstrate general but i outcomes. Show evidence familiar situations. Apply mc Demonstrate partial but lim Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical al	wide range of complex, familiar and unfamiliar sommand of a broad range of knowledge and skilly vidence of analytical and critical abilities and logicons. Apply effective organizational and presentation complete command of knowledge and skills of some analytical and critical abilities and logic derately effective organizational and presentation ited command of knowledge and skills required the command of knowledge and skills required the command logical thinking, but with limited analytical same command the command that command the command	ills required for attaining at leas cal thinking, and ability to apply onal skills. required for attaining most of cal thinking, and ability to apply nal skills. for attaining some of the course tical and critical abilities. Show I and presentational skills. red for attaining the course lear rry little or no ability to apply	e organizational and at most of the course knowledge to familia the course learning y knowledge to mos e learning outcomes imited ability to apply ming outcomes. Laci	
	C D Fail	to apply knowledge to a w presentational skills. Demonstrate substantial co learning outcomes. Show evand some unfamiliar situatic Demonstrate general but i outcomes. Show evidence familiar situations. Apply mc Demonstrate partial but lim Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical al	pride range of complex, familiar and unfamiliar sommand of a broad range of knowledge and skilly vidence of analytical and critical abilities and logicons. Apply effective organizational and presentatils nocomplete command of knowledge and skills of some analytical and critical abilities and logic oderately effective organizational and presentation ited command of knowledge and skills required the rent and logical thinking, but with limited analyt is. Apply limited or barely effective organizational dence of command of knowledge and skills required the command of knowledge and skills required.	ills required for attaining at leas cal thinking, and ability to apply onal skills. required for attaining most of cal thinking, and ability to apply nal skills. for attaining some of the course tical and critical abilities. Show I and presentational skills. red for attaining the course lear rry little or no ability to apply	e organizational and at most of the course knowledge to familia the course learning y knowledge to mos e learning outcomes imited ability to apply ming outcomes. Laci	
Course Type	C D Fail	to apply knowledge to a w presentational skills. Demonstrate substantial co learning outcomes. Show evand some unfamiliar situatic Demonstrate general but i outcomes. Show evidence familiar situations. Apply mc Demonstrate partial but lim Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical al problems. Organization and	pride range of complex, familiar and unfamiliar sommand of a broad range of knowledge and skilly vidence of analytical and critical abilities and logicons. Apply effective organizational and presentatils nocomplete command of knowledge and skills of some analytical and critical abilities and logic oderately effective organizational and presentation ited command of knowledge and skills required the rent and logical thinking, but with limited analyt is. Apply limited or barely effective organizational dence of command of knowledge and skills required the command of knowledge and skills required.	ills required for attaining at leas cal thinking, and ability to apply onal skills. required for attaining most of cal thinking, and ability to apply nal skills. for attaining some of the course tical and critical abilities. Show I and presentational skills. red for attaining the course lear rry little or no ability to apply	e organizational and at most of the course knowledge to familia the course learning y knowledge to mos e learning outcomes imited ability to apply ming outcomes. Laci	
Course Type Course Teaching	C D Fail	to apply knowledge to a w presentational skills. Demonstrate substantial co learning outcomes. Show ev and some unfamiliar situatic Demonstrate general but i outcomes. Show evidence familiar situations. Apply mc Demonstrate partial but lim Show evidence of some cod knowledge to solve problem Demonstrate little or no evic of analytical and critical al problems. Organization and based course	pride range of complex, familiar and unfamiliar sommand of a broad range of knowledge and skill vidence of analytical and critical abilities and logic ons. Apply effective organizational and presentation complete command of knowledge and skills of some analytical and critical abilities and logic oderately effective organizational and presentation ited command of knowledge and skills required the present and logical thinking, but with limited analyt is. Apply limited or barely effective organizational dence of command of knowledge and skills requibilities, logical and coherent thinking. Show we presentational skills are minimally effective or incomplete the presentational skills are minimally effective or incomplete.	ills required for attaining at leas cal thinking, and ability to apply onal skills. required for attaining most of cal thinking, and ability to apply nal skills. for attaining some of the course tical and critical abilities. Show I and presentational skills. red for attaining the course lear rry little or no ability to apply	e organizational and at most of the course knowledge to familia the course learning y knowledge to mos e learning outcomes imited ability to apply ming outcomes. Lack knowledge to solve	
Course Type Course Teaching & Learning Activities	C D Fail Lecture- Activiti	to apply knowledge to a w presentational skills.  Demonstrate substantial co learning outcomes. Show ev and some unfamiliar situatic Demonstrate general but i outcomes. Show evidence familiar situations. Apply mc Demonstrate partial but lim Show evidence of some col knowledge to solve problem Demonstrate little or no evic of analytical and critical al problems. Organization and based course	pride range of complex, familiar and unfamiliar sommand of a broad range of knowledge and skill vidence of analytical and critical abilities and logic ons. Apply effective organizational and presentation complete command of knowledge and skills of some analytical and critical abilities and logic oderately effective organizational and presentation ited command of knowledge and skills required the present and logical thinking, but with limited analyt is. Apply limited or barely effective organizational dence of command of knowledge and skills requibilities, logical and coherent thinking. Show we presentational skills are minimally effective or incomplete the presentational skills are minimally effective or incomplete.	ills required for attaining at leas cal thinking, and ability to apply onal skills. required for attaining most of cal thinking, and ability to apply nal skills. for attaining some of the course tical and critical abilities. Show I and presentational skills. red for attaining the course lear rry little or no ability to apply	e organizational and at most of the course knowledge to familia the course learning y knowledge to mos e learning outcomes imited ability to apply ming outcomes. Lack knowledge to solve	

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4
	Examination	One 3-hour written examination	75	CLO 1,2,3,4
Required/recommended reading and online materials	Klugman S. A., Panjer H. H., & V 2012, 4th edition)	Villmot G. E.: Loss Models: From I	Data to Decisions (John \	Wiley & Sons, Inc.,
Course Website	moodle.hku.hk			

STAT3907	Linear m	nodels and forecast	ing (6 credits)	Academic Yea	ar 2017		
Offering Department	Statistics 8	& Actuarial Science		Quota			
Course Co-ordinator	Dr G Li, S	tatistics & Actuarial Scie	nce (gdli@hku.hk)				
Teachers Involved	(Dr G Li,S	tatistics & Actuarial Scie	ence)				
Course Objectives	This cours	e deals with applied sta	itistical methods of linear models an	d investigates various fore	ecasting procedures		
	through us	sing linear models and ti	me series analysis.				
Course Contents	Regressio	n and multiple linear r	regression; predicting; generalised	linear model; time series	s models including		
& Topics	autoregres	ssive, moving average, a	autoregressive-moving average and	integrated models; foreca	isting.		
Course Learning	On succes	ssful completion of this o	course, students should be able to:				
Outcomes	CLO 1	fit a simple or multiple	e linear regression model to real data	a			
	CLO 2	do ANOVA analysis					
	CLO 3	fit a generalized linea	ar model to the real data				
	CLO 4	identify and fit a suita	ble AR, MA or ARMA model to real	data			
	CLO 5	perform residual anal	lysis				
	CLO 6	Do forecasting with the	nese fitted models				
Pre-requisites	Pass in S		or already enrolled in this course; as	nd			
(and Co-requisites	Not for stu	dents who have passed	I in STAT3600, or have already enro	lled in this course; and			
and Impermissible	Not for stu	dents who have passed	I in STAT4601, or have already enro	lled in this course; and			
combinations)	Not for stu	dents who have passed	in ECON2280, or have already enro	olled in this course; and			
	For BSc(A	ctuarial Science) studer	nts only.				
Offer in 2017 - 2018	Y 2nd	sem Offer in 2018 - 2	2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and						
	В	presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most					
	D	familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
•	Tutorials				12		
		Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6		
	Examinat	ion	One 3-hour written examination	75	CLO 1,2,4,5,6		
Required/recommended reading and online materials	Abraham a	§ J. Ledolter: Statistical	conometric Models and Economic F Methods for Forecasting (John Wile Reinsel: Time Series Analysis: Fore	y & Sons, 2005, 2nd edition	on) <sup>^</sup>		
Course Website	moodle.hk	ıı hk					
Course Mensile	THOUGHE.TIK	u.iii					

STAT3908	Credibility theory and loss distributions (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr A G Benchimol, Statistics & Actuarial Science (ug_enquiry@saas.hku.hk)		
Teachers Involved	(Dr A G Benchimol, Statistics & Actuarial Science)		
Course Objectives	Credibility is an example of a statistical estimate. The idea of credib calculation. Insurance loss varies according to the business nature, what diparticular loss is both of theoretical interest and practical importance. This coustatistical methods.	stribution should	be used to fit a
Course Contents & Topics	Limited fluctuation approach; Buhlman's approach; Bayesian approach; empiriconstruction and selection of parametric models; properties and estimation of determination of the acceptability of a fitted model; comparison of fitted mode continuous random variables.	failure time and I	oss distributions
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 apply limited fluctuation (classical) credibility including criteria for both fu CLO 2 perform Bayesian analysis using both discrete and continuous models CLO 3 apply Buhlmann and Buhlmann-Straub models and understand the rel	•	•

		odel	n Dayonian analysis and in narticular t	no Dojogon gommo madal					
	CLO 4 apply conjugate priors in Bayesian analysis and in particular the Poisson-gamma model CLO 5 apply empirical Bayesian methods in the nonparametric and semiparametric cases								
		onstruct and select em		emparamento cases					
			ility of a fitted model and/or compare n	nodels					
Pre-requisites		ss in STAT2602 or STAT3902 or STAT3906							
(and Co-requisites and Impermissible combinations)	1 433 111 0	33 III OTAT2002 01 OTAT3302 01 OTAT3300							
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 -	· 2019 : Y	Examination	Dec				
Grade Descriptors (A+ to F)	A	learning outcomes. Show	mastery at an advanced level of extensive know strong analytical and critical abilities and logic a wide range of complex, familiar and unfamili	cal thinking, with evidence of original	ginal thought, and ability				
	В	learning outcomes. Show	command of a broad range of knowledge and v evidence of analytical and critical abilities and ations. Apply effective organizational and preser	logical thinking, and ability to app					
	С								
			moderately effective organizational and present						
	D	Demonstrate partial but I Show evidence of some	limited command of knowledge and skills require coherent and logical thinking, but with limited ar	red for attaining some of the connalytical and critical abilities. Sho					
	D Fail	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no of analytical and critical	limited command of knowledge and skills requi	red for attaining some of the con allytical and critical abilities. Sho onal and presentational skills. equired for attaining the course I wery little or no ability to app	ow limited ability to apply earning outcomes. Lack				
Course Type	Fail	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no of analytical and critical	limited command of knowledge and skills require coherent and logical thinking, but with limited and lems. Apply limited or barely effective organizatire evidence of command of knowledge and skills re l abilities, logical and coherent thinking. Show	red for attaining some of the con allytical and critical abilities. Sho onal and presentational skills. equired for attaining the course I wery little or no ability to app	ow limited ability to apply earning outcomes. Lack				
Course Teaching	Fail	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no e of analytical and critical problems. Organization a ased course	limited command of knowledge and skills require coherent and logical thinking, but with limited and lems. Apply limited or barely effective organizatire evidence of command of knowledge and skills re l abilities, logical and coherent thinking. Show	red for attaining some of the con allytical and critical abilities. Sho onal and presentational skills. equired for attaining the course I wery little or no ability to app	ow limited ability to apply earning outcomes. Lack				
Course Teaching	Fail Lecture-ba	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no e of analytical and critical problems. Organization a ased course	limited command of knowledge and skills require coherent and logical thinking, but with limited an lems. Apply limited or barely effective organizating evidence of command of knowledge and skills relabilities, logical and coherent thinking. Show and presentational skills are minimally effective or the contract of the	red for attaining some of the con allytical and critical abilities. Sho onal and presentational skills. equired for attaining the course I wery little or no ability to app	earning outcomes. Lack oly knowledge to solve				
Course Teaching	Fail  Lecture-ba  Activities Lectures Tutorials	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no of analytical and critical problems. Organization a assed course	limited command of knowledge and skills require coherent and logical thinking, but with limited an lems. Apply limited or barely effective organizating evidence of command of knowledge and skills relabilities, logical and coherent thinking. Show and presentational skills are minimally effective or the contract of the	red for attaining some of the con allytical and critical abilities. Sho onal and presentational skills. equired for attaining the course I wery little or no ability to app	we limited ability to apply earning outcomes. Lack bly knowledge to solve  No. of Hours  36 12				
Course Teaching	Fail  Lecture-ba  Activities Lectures Tutorials	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no e of analytical and critical problems. Organization a ased course	limited command of knowledge and skills require coherent and logical thinking, but with limited an lems. Apply limited or barely effective organizating evidence of command of knowledge and skills relabilities, logical and coherent thinking. Show and presentational skills are minimally effective or the contract of the	red for attaining some of the con allytical and critical abilities. Sho onal and presentational skills. equired for attaining the course I wery little or no ability to app	w limited ability to apply earning outcomes. Lack bly knowledge to solve  No. of Hours  36				
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba  Activities Lectures Tutorials	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no of analytical and critical problems. Organization a assed course	limited command of knowledge and skills require coherent and logical thinking, but with limited an lems. Apply limited or barely effective organizating evidence of command of knowledge and skills relabilities, logical and coherent thinking. Show and presentational skills are minimally effective or the contract of the	red for attaining some of the con allytical and critical abilities. Sho onal and presentational skills. equired for attaining the course I wery little or no ability to app	ow limited ability to apply earning outcomes. Lack bly knowledge to solve  No. of Hours 36 12 100  Assessment Methods				
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading /	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no of analytical and critical problems. Organization a assed course S	limited command of knowledge and skills requicoherent and logical thinking, but with limited ar lems. Apply limited or barely effective organizative vidence of command of knowledge and skills relabilities, logical and coherent thinking. Show and presentational skills are minimally effective of Details	red for attaining some of the conalytical and critical abilities. Sho nonal and presentational skills. equired for attaining the course I wery little or no ability to apport ineffective.  Weighting in final	we limited ability to apply earning outcomes. Lack bly knowledge to solve  No. of Hours  36  12  100  Assessment				
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  Lecture-ba Activities Lectures Tutorials Reading / Methods	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no e of analytical and critical problems. Organization a assed course	limited command of knowledge and skills requicoherent and logical thinking, but with limited ar lems. Apply limited or barely effective organizatic evidence of command of knowledge and skills reliable abilities, logical and coherent thinking. Show and presentational skills are minimally effective of Details  Details  Details  Coursework (assignments,	red for attaining some of the conalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course I very little or no ability to apport ineffective.  Weighting in final course grade (%)	w limited ability to apply earning outcomes. Lack bly knowledge to solve  No. of Hours  36  12  100  Assessment Methods to CLO Mapping				
Course Teaching & Learning Activities Assessment Methods	Fail  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinati	Demonstrate partial but I Show evidence of some knowledge to solve probl Demonstrate little or no e of analytical and critical problems. Organization a assed course	limited command of knowledge and skills requicoherent and logical thinking, but with limited ar lems. Apply limited or barely effective organizatic evidence of command of knowledge and skills reliable and presentational skills are minimally effective of Details  Details  Coursework (assignments, tutorials, and a class test)	red for attaining some of the conalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course I were very little or no ability to apport ineffective.  Weighting in final course grade (%)  25  75	No. of Hours  No. of Hours  36  12  100  Assessment Methods to CLO Mapping  CLO 1,2,3,4,5,6,7  CLO 1,2,3,4,5,6,7				

	Advanc	Advanced life contingencies (6 credits)  Academic Year 2017						2017
Offering Department		Statistics & Actuarial Science Quota						
Course Co-ordinator	Dr D Lee, Statistics & Actuarial Science (leedav@hku.hk)							
Teachers Involved	(Dr D Lee, Statistics & Actuarial Science)							
Course Objectives	Continger	The objective of the course is to prepare students for the Non-traditional Life Insurance parts of the Models for Life Contingencies (MLC) course of the Society of Actuaries. Emphasis will be placed on applications of more advanced theories of life contingencies.						
Course Contents & Topics		This course is a continuation of the materials covered in STAT3901. We shall discuss the following topics: Future loss random variable, Benefit reserves, Cash flow projection, Present value of cash flows, Expenses and asset shares.						
Course Learning	On succe	essful completio	of this cour	se, students s	hould be ab	e to:		
Outcomes	CLO 1 ca	alculate benefit	reserves for	life insurance:	and annuit	es		
		ncorporate expensurances and a		ss premium a	nd calculate	policy value b	ased on the gross	premium for life
	d	ecrements					s and annuities in	models with mult
	CLO 4 understand the multiple state model and the Kolmogorov forward equations							
	CLO 5 understand multiple life models and calculate the life insurances and annuities in multi-life models							
	CLO 6 understand the interest risk and calculate the life insurances and annuities when the interest rate is not a constant, and understand profit testing							
Pre-requisites	Pass in STAT3901, or already enrolled in this course; and For BSc(Actuarial Science) students only.							
(and Co-requisites and Impermissible	For BSc(				e, and			
(and Co-requisites and Impermissible combinations)	,	Actuarial Scienc		only.	se, and		Examination	May
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	,	d sem Offer in Demonstrate the learning outcome	e) students of 2018 - 2019 rough mastery as. Show strong the to a wide r	only.  The street on the street of the stree	level of extensitical abilities a	nd logical thinking,	<b>Examination</b> d skills required for at with evidence of origins. Apply highly effective	taining all the course
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd	d sem Offer in  Demonstrate the learning outcom to apply knowle presentational si  Demonstrate si learning outcom to apply knowle presentational si	2018 - 2019 rough mastery s. Show strong ige to a wide r ills. sstantial comma s. Show eviden	only.  It is at an advanced a nandytical and control to the complex and of a broad rance of analytical a	level of extensifical abilities a k, familiar and nge of knowled nd critical abiliti	nd logical thinking, unfamiliar situation lge and skills requ	d skills required for at with evidence of origin s. Apply highly effective ired for attaining at lea king, and ability to apply	taining all the course hal thought, and ability we organizational and st most of the course
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd	Actuarial Science  d sem Offer in  Demonstrate the learning outcom to apply knowle presentational si  Demonstrate su learning outcom and some unfam  Demonstrate ge outcomes. Show famillar situation	e) students of 2018 - 2019 rough mastery is. Show strong tige to a wide rills. stantial commass. Show eviden lilar situations. A neral but income evidence of sc. Apply modera.	only.  at an advanced g analytical and c range of complex and of a broad range of analytical a Apply effective on plete command me analytical ar tely effective org.	level of extenitical abilities as, familiar and nge of knowled of critical abilitiganizational and distributional abilitianizational and	nd logical thinking, unfamiliar situation ige and skills requiles and logical think d presentational ski and skills required es and logical think presentational skills	d skills required for at with evidence of origins. Apply highly effective ired for attaining at leading, and ability to apply lls. If for attaining most of king, and ability to apply s.	taining all the course all thought, and ability we organizational and st most of the course knowledge to familia f the course learning ly knowledge to mos
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd	d sem Offer ir  Demonstrate the learning outcom to apply knowle presentational sl Demonstrate sul learning outcom and some unfarn Demonstrate go outcomes. Show familiar situation Demonstrate pa Show evidence e	e) students of 2018 - 2019 rough mastery is. Show strong ige to a wide rillar situations. An exidence of so. Apply moderatial but limited of some coherer	only.  3 : Y at an advanced a analytical and c range of complex and of a broad ra nce of analytical a Apply effective or, prompt an analytical ar attely effective org tommand of know and logical thin	level of extensitical abilities a k, familiar and nge of knowled in critical abilitizanizational and of knowledge d critical abilitianizational and wledge and skill king, but with lie	nd logical thinking, unfamiliar situation lge and skills requires and logical think d presentational skil and skills required es and logical think presentational skills is required for attai	d skills required for at with evidence of origirs. Apply highly effective ired for attaining at lea sing, and ability to apply lis.  If for attaining most of king, and ability to apps.  In ing some of the cours of critical abilities. Show	taining all the course all thought, and ability we organizational and st most of the course knowledge to familia f the course learning ly knowledge to most se learning outcomes
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd A B C	d sem Offer ir  Demonstrate the learning outcome to apply knowle presentational sl Demonstrate sul learning outcome and some unfam Demonstrate ge outcomes. Show familiar situation Demonstrate pas Show evidence knowledge to so Demonstrate littl of analytical anniptical anniptical anniptical situation of the strength o	e) students of 2018 - 2019 rough mastery is. Show strong ige to a wide rills. stantial commas. Show eviden lilar situations. A ceral but incon evidence of so. Apply modera tial but limited of some coherer we problems. Ap	at an advanced a analytical and crange of complex and of a broad race of analytical adply effective organizely effective organized or bain and logical thin poly limited or bain e of command of s.s., logical and command of s.s., logical and command of s.s., logical and command of s.s.	level of extensitical abilities a c, familiar and nge of knowled and critical abiliti ganizational and effective and skil king, but with lie ely effective or knowledge and skil knowledge and shil knowledge and shil chosens	nd logical thinking, unfamiliar situation lge and skills reques and logical think d presentational ski and skills required as and logical think is required for attal mited analytical and panizational and pro skills required for	d skills required for at with evidence of origin s. Apply highly effective ired for attaining at lea sing, and ability to apply lis. If for attaining most of sing, and ability to apply some of the cours d critical abilities. Show esentational skills. attaining the course lea or no ability to apply	taining all the course all thought, and ability we organizational and st most of the course knowledge to familia f the course learning ly knowledge to most se learning outcomes limited ability to apply arning outcomes. Laci
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 2nd A B C D	d sem Offer ir  Demonstrate the learning outcome to apply knowle presentational sl Demonstrate sul learning outcome and some unfam Demonstrate ge outcomes. Show familiar situation Demonstrate pas Show evidence knowledge to so Demonstrate littl of analytical anniptical anniptical anniptical situation of the strength o	e) students of 2018 - 2019 rough mastery is. Show strong ige to a wide rills. stantial commas. Show eviden lilar situations. A ceral but incon evidence of so. Apply modera tial but limited of some coherer we problems. Ap	at an advanced a analytical and crange of complex and of a broad race of analytical adply effective organizely effective organized or bain and logical thin poly limited or bain e of command of s.s., logical and command of s.s., logical and command of s.s., logical and command of s.s.	level of extensitical abilities a c, familiar and nge of knowled and critical abiliti ganizational and effective and skil king, but with lie ely effective or knowledge and skil knowledge and shil knowledge and shil chosens	nd logical thinking, unfamiliar situation lge and skills requ es and logical think d presentational ski and skills required es and logical thinh presentational skills is required for attal mited analytical and panizational and pro skills required for 3. Show very little	d skills required for at with evidence of origin s. Apply highly effective ired for attaining at lea sing, and ability to apply lis. If for attaining most of sing, and ability to apply some of the cours d critical abilities. Show esentational skills. attaining the course lea or no ability to apply	taining all the course all thought, and ability we organizational and st most of the course knowledge to familia f the course learning ly knowledge to most se learning outcomes limited ability to apply arning outcomes. Laci

& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6
	Examination	One 3-hour written examination	75	CLO 1,2,3,4,5,6
Required/recommended reading and online materials		nematics (Society of Actuaries, 1997 ad Waters, H.R.: Actuarial Mathem		t Risks (Cambridge
Course Website	moodle.hku.hk			

STAT3910	Financia	I economics I (6	credits)	Academic Yea	r 2017		
Offering Department	Statistics 8	ratistics & Actuarial Science Quota Prof H L Yang, Statistics & Actuarial Science (hlyang@hku.hk)					
Course Co-ordinator							
Teachers Involved		ang,Statistics & Act					
Course Objectives	This course is a basic course on the derivative market. The course covers discrete-time models, volatility estimation, and Black-Scholes formula and its variations. The course also includes some basic risk management ideas and methods. This course and STAT3911 will cover all the concepts, principles and techniques needed for SoA Exam MFE.						
Course Contents & Topics	Option market; European and American options; conditional expectation and discrete-time martingale, discrete time option-pricing theory; binomial model and its Greeks; true probabilities vs. risk-neutral probabilities; estimating volatility; the Black-Scholes formula; implied volatility; Greeks again; market-making and hedging; exotic options.						
Course Learning Outcomes		sful completion of the lculate option price u	is course, students should be able to: using binomial tree				
		derstand the risk ne	•				
	CLO 3 un	derstand basic prob	pability theory, include probability span	ce, random variable, cond	itional probability,		
		derstand the Black- plied volatility	-Scholes formula and its assumptions	s, the option Greeks, opti	on elasticity, and		
		derstand the hedgin derstand exotic option	g strategies and portfolio, market-make ons	er risk, self-financing portfol	io		
Pre-requisites		AT2602 or STAT39					
(and Co-requisites and Impermissible combinations)	Not for stu	dents who have pas	sed in STAT3618, or have already enro sed in FINA2322, or have already enro				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018	- 2019 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	·					
	С						
	D						
	Fail	of analytical and critical	evidence of command of knowledge and skills ral abilities, logical and coherent thinking. Show and presentational skills are minimally effective of	v very little or no ability to appl			
Course Type	Lecture-ba	sed course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6		
	Examinati	on	One 3-hour written examination	75	CLO 1,2,3,4,5,6		
Required/recommended	Robert L. I	McDonald: Derivative	es Markets (2nd edition), Chapters 10-	14			
reading and online materials			xpectations and martingale d other Derivatives (2008, 7th edition)				
	moodle.hk		• • • • • • • • • • • • • • • • • • • •				

STAT3911	Financial economics II (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Prof H L Yang, Statistics & Actuarial Science (hlyang@hku.hk)		
Teachers Involved	(Prof H L Yang, Statistics & Actuarial Science)		
Course Objectives	This course is an advanced course on the option pricing theory. The course of stochastic calculus, and interest models. This course and STAT3910 will cover techniques needed for SoA Exam MFE.		
Course Contents & Topics	Brownian motion; introduction to stochastic calculus; arithmetic and geomet Sharpe ratio and risk premium; Black-Scholes equation; risk-neutral stock-poption's elasticity and volatility; Vasicek, Cox-Ingersoll-Ross, and Black-Derm	orice process and	d option pricing;

	and capl	ets.		•	•			
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 understand Brownian motion and its properties							
	CLO 2 understand the Ito calculus and Ito formula							
	CLO 3 understand the Black-Scholes model and option pricing theory							
	CLO 4 understand the delta hedging and some basic risk management methods							
	CLO 5	understand some basic						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in N	ass in MATH3603 or STAT3603 or STAT3903 or STAT3910						
Offer in 2017 - 2018	Y 2n	nd sem Offer in 2018 - 2	2019 : Y	Examination	May			
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of extensive knotrong analytical and critical abilities and logic vide range of complex, familiar and unfamili	cal thinking, with evidence of or	iginal thought, and ability			
	В	learning outcomes. Show e	ommand of a broad range of knowledge and vidence of analytical and critical abilities and ons. Apply effective organizational and preser	logical thinking, and ability to ap				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
		Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	D	Show evidence of some col	ited command of knowledge and skills requi herent and logical thinking, but with limited ar	red for attaining some of the conalytical and critical abilities. Sh				
	D Fail	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical al	ited command of knowledge and skills requi herent and logical thinking, but with limited ar	red for attaining some of the co- nalytical and critical abilities. Sho nal and presentational skills. equired for attaining the course v very little or no ability to ap	ow limited ability to apply learning outcomes. Lack			
Course Type	Fail	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical al	ited command of knowledge and skills requi herent and logical thinking, but with limited an ns. Apply limited or barely effective organizati dence of command of knowledge and skills r bilities, logical and coherent thinking. Show	red for attaining some of the co- nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course v very little or no ability to ap	ow limited ability to apply learning outcomes. Lack			
	Fail	Show evidence of some col knowledge to solve problem Demonstrate little or no evide of analytical and critical al problems. Organization and based course	ited command of knowledge and skills requi herent and logical thinking, but with limited an ns. Apply limited or barely effective organizati dence of command of knowledge and skills r bilities, logical and coherent thinking. Show	red for attaining some of the co- nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course v very little or no ability to ap	ow limited ability to apply learning outcomes. Lack			
Course Teaching	Fail Lecture-l	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical al problems. Organization and based course	ited command of knowledge and skills requi herent and logical thinking, but with limited an ns. Apply limited or barely effective organizati dence of command of knowledge and skills r bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	red for attaining some of the co- nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course v very little or no ability to ap	low limited ability to apply learning outcomes. Lack apply knowledge to solve			
Course Teaching	Fail Lecture-l	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical a problems. Organization and based course	ited command of knowledge and skills requi herent and logical thinking, but with limited an ns. Apply limited or barely effective organizati dence of command of knowledge and skills r bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	red for attaining some of the co- nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course v very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve			
Course Teaching	Fail Lecture-l Activitie Lectures Tutorials	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical a problems. Organization and based course	ited command of knowledge and skills requi herent and logical thinking, but with limited an ns. Apply limited or barely effective organizati dence of command of knowledge and skills r bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	red for attaining some of the co- nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack pply knowledge to solve  No. of Hours  36			
Course Teaching & Learning Activities  Assessment Methods	Fail Lecture-l Activitie Lectures Tutorials	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical al problems. Organization and based course	ited command of knowledge and skills requi herent and logical thinking, but with limited an ns. Apply limited or barely effective organizati dence of command of knowledge and skills r bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	red for attaining some of the co- nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack pply knowledge to solve  No. of Hours  36  12			
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-I  Activitie  Lectures  Tutorials  Reading	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical al problems. Organization and based course es S S S S / / Self study	ited command of knowledge and skills requi herent and logical thinking, but with limited an ss. Apply limited or barely effective organizati dence of command of knowledge and skills n bilities, logical and coherent thinking. Show d presentational skills are minimally effective of Details	red for attaining some of the co- nalytical and critical abilities. Sh onal and presentational skills. equired for attaining the course very little or no ability to ap or ineffective.  Weighting in final	No. of Hours  36  12  100  Assessment Methods to CLO 1,2,3,4,5			
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  Lecture-l Activitie Lectures Tutorials Reading Method	Show evidence of some colknowledge to solve problem Demonstrate little or no evid of analytical and critical a problems. Organization and based course	ited command of knowledge and skills requiherent and logical thinking, but with limited an ins. Apply limited or barely effective organization dence of command of knowledge and skills rebilities, logical and coherent thinking. Show the presentational skills are minimally effective of the property of t	red for attaining some of the co- alytical and critical abilities. Sh onal and presentational skills. equired for attaining the course v very little or no ability to ap or ineffective.  Weighting in final course grade (%)	No. of Hours  100  No. of Hours  100  Assessment Methods to CLO Mapping			
Course Teaching & Learning Activities  Assessment Methods	Fail  Lecture-I Activitie Lectures Tutorials Reading Method:  Assignm Examina Robert L John Hul Alison Et	Show evidence of some colknowledge to solve problem Demonstrate little or no evid of analytical and critical aproblems. Organization and based course esses of a solve problems of analytical and critical aproblems. Organization and based course esses of a solve problems of a solve problems. Solve problems of a solve problems. McDonald: Derivatives I lit: Options, Futures and Catheridge: A Course in Final solve problems.	ited command of knowledge and skills requiherent and logical thinking, but with limited an sa. Apply limited or barely effective organization. Apply limited or barely effective organization of command of knowledge and skills in bilities, logical and coherent thinking. Show of presentational skills are minimally effective of prese	red for attaining some of the co- nalytical and critical abilities. Sh onal and presentational skills. equired for attaining the course of very little or no ability to ap or ineffective.  Weighting in final course grade (%)  25  75 21 and 24.	No. of Hours  36  12  100  Assessment Methods to CLO 1,2,3,4,5			

STAT3951	Advand	Advanced contingencies (6 credits)  Academic Year 2017							
Offering Department	Statistics	Statistics & Actuarial Science Quota							
Course Co-ordinator	Dr D Lee	Dr D Lee, Statistics & Actuarial Science (leedav@hku.hk)							
Teachers Involved	(Dr D Le	(Dr D Lee, Statistics & Actuarial Science)							
Course Objectives	insuranc	This course covers more advanced stochastic models and actuarial techniques used in the field of life and non-life insurance. [Students are reminded that this course is a part of the requirement for the exemption from the Subject CT5 Contingencies of the Institute and Faculty of Actuaries, U.K.]							
Course Contents & Topics	application	ations of actu	iarial téchniques t	o a wide range of	del; unit-linked contract insurance problems. Ed els for non-life insurance	quity linked insura	•		
Course Learning	On succe	On successful completion of this course, students should be able to:							
Outcomes		understand transitions	how to use mul	tiple state models	s to evaluate expected	cashflows dependent	dent upon state		
		understand insurance		insurance produc	cts, and the method and	d idea of valuing t	the equity linked		
	CLO 3 understand the Esscher transform and its application to option pricing								
	CLO 4 value equity-linked death benefits								
	CLO 5 evaluate ruin probabilities in simple risk processes for non-life insurance								
	CLO 6 evaluate expected discounted dividends in simple risk processes with dividends								
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S		and or already enrolle Science) students (		nd				
Offer in 2017 - 2018	Y 1s	1st sem O	fer in 2018 - 2019	: Y		Examination	Dec		
Grade Descriptors (A+ to F)	A	learning of to apply	utcomes. Show strong	analytical and critical	of extensive knowledge and abilities and logical thinking, v niliar and unfamiliar situations	with evidence of original	al thought, and ability		
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.							
	С								
	D	Show evi	dence of some coherer	nt and logical thinking,	e and skills required for attain but with limited analytical and ffective organizational and pre	critical abilities. Show			
	Fail				rledge and skills required for a nt thinking. Show very little				

	problems. Organization	problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-based course						
Course Teaching & Learning Activities	Activities Details			No. of Hours			
	Lectures			36			
	Tutorials			12			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6			
	Examination	One 3-hour written examination	75	CLO 1,2,3,4,5,6			
Required/recommended reading and online materials	Dickson, D. et al.: Actuarial Ma CT5 Contingencies Core Tech	Mathematics (Society of Actuaries, 1997 of thematics for Life Contingent Risks (Can consider the Actuaries of Actuaries insurance products and simple dividence	ambridge, 2010) es, 2010)				
Course Website	moodle.hku.hk						

STAT3952	Investme	nvestment and asset management (6 credits)  Academic Year   2017						
Offering Department		Statistics & Actuarial Science Quota						
Course Co-ordinator		istics & Actuarial Scie	nce ()	1 44.2.2.				
Teachers Involved	(TBC,Stati	istics & Actuarial Scie	nce)					
Course Objectives			se is to introduce students to some of the	methods and procedur	es commonly use			
-		· ·	stment portfolio. Emphasis will be placed		problems faced I			
			stment strategy formulation and interest i					
Course Contents		•	view on the problems faced by actuarie	,				
& Topics			e. This course will cover the following		agement Proces			
Causa Laassina			ed Income Portfolios and Performance Mo	easurement.				
Course Learning Outcomes			s course, students should be able to: ent policy and an investment strategy car	holp manago rick				
Outcomes			of a fiduciary in managing investment por					
		, ,	t an investment strategy for an individu		issues influencin			
			or institutional investors	dai and the particular	ioodeo iiiiideiioii			
			c-based capital management					
			n strategies that can be used to construc	t an asset portfolio				
			ancial and non-financial risks faced by ar					
	CLO 7 de	efine risk metrics to q	uantify major types of risk exposure, app	oly ALM principles to th	e establishment			
	inv	vestment policy and s	trategy					
			nmark for a given portfolio or portfolio		scribe and asses			
			nent methodologies for investment portfoli	os				
Pre-requisites		TAT3901; and						
(and Co-requisites		•	ed in FINA2320, or have already enrolled	I in this course; and				
and Impermissible	For BSc(A	octuarial Science) stud	dents only.					
combinations)	N Off-	:- 0040 0040 · N		F				
Offer in 2017 - 2018		er in 2018 - 2019 : N	aceton, at an advanced level of systemsive knowle	Examination				
Grade Descriptors (A+ to F)	Α		nastery at an advanced level of extensive knowle v strong analytical and critical abilities and logical t					
(A+ to F)		to apply knowledge to a	wide range of complex, familiar and unfamiliar					
	presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course							
	В							
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familian and some unfamiliar situations. Apply effective organizational and presentational skills.							
	С	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most						
			moderately effective organizational and presentation		ply knowledge to mi			
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.							
	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lac							
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve							
Course Type	Looturo bo		and presentational skills are minimally effective or in	ettective.				
Course Type Course Teaching		ased course	Detaile		No. of House			
& Learning Activities	Activities	3	Details		No. of Hours			
a Learning Activities	Lectures				12			
		Self study			100			
Assessment Methods		Sell Study	D-4-ii-	Mainhtin n in fin al				
Assessment Methods and Weighting	Methods		Details	Weighting in final	Assessmen Methods			
and weighting				course grade (%)	to CLO			
					Mapping			
			Assignments, tutorials/example					
	Assignme	ents	classes, group discussions, project	50	CLO			
			and presentation		1,2,3,4,5,6,7			
	Evender (	ian		<b>F</b> 0	CLO			
	⊫⊨xamınati	ION	One 2-hour written examination	50	1,2,3,4,5,6,7			
		1,2,3,4,5,6,7						
Required/recommended	D. Babbel	. Babbel & F. J. Fabozzi: Investment Management for Insurers (Frank J. Fabozzi & Assoc., 1999)						
reading and	Z. Bodie, A	A. Kane, & A. Marcus	: Investments (McGraw-Hill, 2005, 7th ed	ition)				
	Z. Bodie, A Crouhy, Ga	A. Kane, & A. Marcus alai, & Mark: Risk Ma	: Investments (McGraw-Hill, 2005, 7th ed inagement (2001)	,				
reading and	Z. Bodie, A Crouhy, Ga F. J. Faboz	A. Kane, & A. Marcus Jalai, & Mark: Risk Ma Jazi: Handbook of Fixe	: Investments (McGraw-Hill, 2005, 7th ed inagement (2001) ed Income Securities (McGraw-Hill, 2005,	7th edition)				
reading and online materials	Z. Bodie, A Crouhy, Ga F. J. Faboz Litterman:	A. Kane, & A. Marcus alai, & Mark: Risk Ma zzi: Handbook of Fixe Modern Investment N	: Investments (McGraw-Hill, 2005, 7th ed inagement (2001)	7th edition)				
reading and	Z. Bodie, A Crouhy, Ga F. J. Faboz Litterman: moodle.hk	A. Kane, & A. Marcus salai, & Mark: Risk Ma szzi: Handbook of Fixe Modern Investment N ku.hk	: Investments (McGraw-Hill, 2005, 7th ed inagement (2001) ed Income Securities (McGraw-Hill, 2005,	7th edition) (003)				

I	nformation	Dynamic Process (Wiley, 2007, 3rd edition)
		Tilman: Asset / Liability Management of Financial Institutions (2003)

Offering Department Course Co-ordinator Teachers Involved Course Objectives Course Contents & Topics	Mr P P Y L (Mr P P Y	& Actuarial Science					
Teachers Involved Course Objectives Course Contents	(Mr P P Y	au Statistics & Actu		Quota			
Course Objectives Course Contents		au, cialibrios a 7 loto	iarial Science (ug_enquiry@saa	s.hku.hk)			
Course Contents	This cours	Lau, Statistics & Actu	uarial Science)				
	using the a	actuarial control cycle	e as a framework.	t and exposes them to practical r			
& Topics				ing to the following topics: Role			
				and Pricing of Actuarial Solution			
				s including individual life insurand	ce, group insurance		
			nt plans, investment funds and p				
Course Learning		•	is course, students should be al				
Outcomes		,	escription of financial security sy	ystems, common actuarial techn	iques and practical		
	experiences  CLO 2 describe actuarial practices, principles, approaches, methods, commonalities, problems and solutions						
	CLO 3 explain actuarial practices across the traditional areas of practice						
	The state of the s						
	CLO 4 explain actuarial practices as applied directly on behalf of financial security system providers or as a consultant to those providers						
	CLO 5 apply actuarial skills in nontraditional and emerging areas of practice						
			0.0	nical skills developed in the basic	actuarial courses		
			ional role as an Associate of the		actuariai courses		
Pre-requisites		AT3909: and	ional role de dir ricedolate el tric	o coolety of hetaanee			
and Co-requisites							
and Impermissible	,						
ombinations)							
Offer in 2017 - 2018	Y 1st s	sem Offer in 2018	- 2019 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	learning outcomes. Sho	w strong analytical and critical abilities	nsive knowledge and skills required for and logical thinking, with evidence of orig I unfamiliar situations. Apply highly effec	ginal thought, and ability		
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familial and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.  Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Pail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve						
Sauraa Turaa	problems. Organizational and presentational skills are minimally effective or ineffective.  Lecture-based course						
Course Type Course Teaching			Details		No. of Hours		
Learning Activities	Activities		Details		No. of Hours		
Learning Activities	Lectures	- wle			12		
	Project wo						
		Self study		301.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Presentati	ion	oral presentation	25	CLO 4,5,6		
	Project reports		written report	50	CLO 4,5,6,7		
	Project rea		in-class quizzes	25	CLO 1,2,3,4,5,6,7		
	Project rep				GLO 1,2,3,4,3,6,7		
Required/recommended reading and online materials	Test Klugman, S Bellis, C., Cycle (Inst Brown, R. Insurance	Klugman, S., Sheph titute of Actuaries of L. and Gottlieb, L.I (ACTEX Publication	Australia, 2010, 2nd ed.) R.: Introduction to Ratemaking s, Inc., 2007, 3rd ed.)	uaries, 2012) anding Actuarial Management: The grand Loss Reserving for Properties.	ne Actuarial Contro		

STAT3954	Current topics in actuarial science (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	TBC, Statistics & Actuarial Science ()		
Teachers Involved			
Course Objectives	This course aims at providing practical elements for actuarial students includin basic capability to understand, research in and handle the laws as and whe benefit students in their coming future career.		
Course Contents & Topics	This course covers a full range of topics related to both areas including 1) Actuaries' Legal Thinking.	Practical Actuaria	Practice and 2)
	For Practical Actuarial Practice: It covers the major practical topics in both Insurance, it covers the full picture of actuarial control cycle including Pr Reporting and Experience Analysis. For General Insurance, it covers the backland Valuation.	oduct Pricing, Val	uation, Financial
	For Actuaries' Legal Thinking: This is the 7th year of the course and the full stachanges in the market for basic legal and general insurance skills for actuar legal materials with heavy involvement of actuarial and other general insurance.	ies. Intellectually	stimulating recent

			p. 2.00.000. p. 0]000. 0. 0.000 (001(0))				
	Assignme	ents	Coursework (assignments, practical project & class test(s))	100	CLO 1,2,3,4,5,6,7		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	U	Self study			100		
	Tutorials						
& Learning Activities	Lectures				36		
Course Teaching	Activities	3	Details	Details			
Course Type	Lecture-ba	ased course					
	Fail	knowledge to solve pro Demonstrate little or n of analytical and criti	ne coherent and logical thinking, but with limited oblems. Apply limited or barely effective organiz o evidence of command of knowledge and skil cal abilities, logical and coherent thinking. S on and presentational skills are minimally effecti	zational and presentational skills. Is required for attaining the course how very little or no ability to ap	learning outcomes. Lack		
	D	familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.					
	С	and some unfamiliar s  Demonstrate general outcomes. Show evid	ow evidence of analytical and critical abilities a ituations. Apply effective organizational and pre but incomplete command of knowledge and ence of some analytical and critical abilities a law moderately effective organizational and pre-	esentational skills. skills required for attaining most and logical thinking, and ability to a	of the course learning		
	В	Demonstrate substant	ial command of a broad range of knowledge				
Grade Descriptors (A+ to F)	A	learning outcomes. Sh	now strong analytical and critical abilities and lob a wide range of complex, familiar and unfa	ogical thinking, with evidence of or	iginal thought, and ability		
Offer in 2017 - 2018		er in 2018 - 2019 : N	N mastery at an advanced level of extensive	Examination	attaining all the course		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S <sup>-</sup> For BSc(A	TAT3909, or alread actuarial Science) st	•				
			elements of a routine judgment, the n	natrix of the facts and the law	v involved		
			egal researches when facing with lega	ıl problems			
	to	rt	knowledge in certain core legal aspir	ects such as the law of con	tract and the law of		
	CLO 3 possess basic understanding of the legal system in Hong Kong CLO 4 possess fundamental knowledge in certain core legal aspects such as the law of contract and the law of						
	CLO 2 possess some experience regarding fundamental actuarial practice through practical project						
Outcomes	ln:	surance	anding regarding Actuarial Control Cy				
Course Learning			his course, students should be able to				
			rance Industry would also infiltrate the				

STAT3955	Surviva	analysis (6 credits)	A	cademic Year	2017			
Offering Department	Statistics	Actuarial Science	Q	uota				
Course Co-ordinator	Dr J F Xu	Xu, Statistics & Actuarial Science (xujf@hku.hk)						
Teachers Involved	(Dr J F X	J F Xu,Statistics & Actuarial Science)						
Course Objectives	This course is concerned with how models which predict the survival pattern of humans or other entitie established. This exercise is sometimes referred to as survival-model construction.							
Course Contents  & Topics  The nature and properties of parametric and nonparametric survival models will be studied. Topics to be include: the introduction of some important basic quantities like the hazard function and survival function commonly used parametric survival models; concepts of censoring and/or truncation; parametric estimation survival distribution by maximum likelihood estimation method; nonparametric estimation of the survival from possibly censored samples by means of the Kaplan-Meier estimator, the Nelson-Aalen estimator; kernel density estimator or the Ramlau-Hansen estimator and comparisons of k independent survival function means of the generalized log-rank test; parametric regression models; Cox's semiparametric proportional regression model; and multivariate survival analysis.								
Course Learning		sful completion of this course, students sho	uld be able to:					
Outcomes	CLO 1 a	CLO 1 acquire a clear understanding of the nature of failure time data or survival data, a generalization of the concept of death and life						
	n	form estimation for some commonly unchanisms			s of censoring			
	CLO 3 analyze survival data using the Cox's semiparametric proportional hazards model							
	CLO 4 extend the Cox's model to a multivariate setup to accommodate multivariate survival data							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3902, or already enrolled in this course; or Pass in STAT3600 or STAT3901							
Offer in 2017 - 2018	Y 2n	sem Offer in 2018 - 2019 : Y	E	xamination	May			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level learning outcomes. Show strong analytical and critic to apply knowledge to a wide range of complex, figresentational skills.	al abilities and logical thinking, with	evidence of origina	al thought, and abili			
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to and some unfamiliar situations. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete command of outcomes. Show evidence of some analytical and of familiar situations. Apply moderately effective organizations.	critical abilities and logical thinking,					
	D	Demonstrate partial but limited command of knowle Show evidence of some coherent and logical thinkin knowledge to solve problems. Apply limited or barely	dge and skills required for attaining g, but with limited analytical and criti	cal abilities. Show				
	Fail	Demonstrate little or no evidence of command of known			rning outcomes I c			

		al abilities, logical and coherent thinking. Show and presentational skills are minimally effective or		oply knowledge to solve				
Course Type	ecture-based course							
Course Teaching & Learning Activities	Activities	Details		No. of Hours				
	Lectures			36				
	Tutorials			12				
	Reading / Self study			100				
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4				
	Examination	One 3-hour written examination	75	CLO 1,2,3,4				
Required/recommended reading and online materials	Hosmer, D. W. and Lemeshov 1999)	llysis of Survival Data (Chapman and H v, S.: Applied Survival Analysis: Regres r, M. L.: Survival Analysis: Techniques rd.)	ssion Modeling of Time to	, ,,				
Course Website	moodle.hku.hk	,						

Course Website	moodle.hl	ku.hk					
OTAT20F0	Danaian	• <b>f</b> de and manaism	month a month on (C and dita)	A cadamia Vas	0047		
STAT3956			mathematics (6 credits)	Academic Yea	ur 2017		
Offering Department Course Co-ordinator		& Actuarial Science	siones (ama 220@ blu ble)	Quota			
Teachers Involved		a, Statistics & Actuarial S la,Statistics & Actuarial S	cience (gma328@hku.hk)				
Course Objectives				nd management as well a	s the fundamental		
oourse objectives	of pension	s course covers the basics of pension plan design and pension fund management, as well as the fundamentals pension plan valuations using different actuarial cost methods. The students will be introduced to the application actuarial valuation techniques to the funding and accounting of pension plans.  The following topics will be covered: Fundamentals of private pension plans; pricing and valuation of pension					
Course Contents					aluation of pension		
& Topics	of asset a	and liability management.	s and their effects on cost patterns;	selection of actuarial assu	umptions; principle		
Course Learning		•	ourse, students should be able to:				
Outcomes			nefits in accordance with the provision				
			t and actuarial liabilities using differe	ent actuarial cost methods			
			alyses for pension valuations				
			ptions and methods for funding or a	<u> </u>			
			sults presented in actuarial valuation				
			s of asset and liability modeling as re	elated to pension plans			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3909; and For BSc(Actuarial Science) students only.						
Offer in 2017 - 2018	N Off	fer in 2018 - 2019 : Y		Examination			
Grade Descriptors (A+ to F)	A	learning outcomes. Show str to apply knowledge to a win	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the of learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizations presentational skills.				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply					
	Fail	knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type			ilities, logical and coherent thinking. Show	very little or no ability to app	earning outcomes. Lack		
Course ivbe	I a atuura la	problems. Organization and	ilities, logical and coherent thinking. Show	very little or no ability to app	earning outcomes. Lacl		
		problems. Organization and pased course	ilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	earning outcomes. Lack		
Course Teaching	Activities	problems. Organization and assed course	ilities, logical and coherent thinking. Show	very little or no ability to app	earning outcomes. Lack ly knowledge to solve No. of Hours		
	Activities Lectures	problems. Organization and assed course	ilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	earning outcomes. Lackly knowledge to solve  No. of Hours  36		
Course Teaching	Activities Lectures Tutorials	problems. Organization and lased course	ilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	earning outcomes. Lacily knowledge to solve  No. of Hours  36 12		
Course Teaching & Learning Activities	Activities Lectures Tutorials Reading	problems. Organization and lased course  s  / Self study	ilities, logical and coherent thinking. Show presentational skills are minimally effective o Details	very little or no ability to apprineffective.	No. of Hours 36 12 100		
Course Teaching	Activities Lectures Tutorials	problems. Organization and lased course  s  / Self study	ilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	earning outcomes. Lacily knowledge to solve  No. of Hours  36 12		
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading	problems. Organization and lased course s	Details  Details  Coursework (assignments, tutorials, and a class test)	very little or no ability to apprineffective.  Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO 1,2,3,4,5,6		
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Tutorials Reading Methods	problems. Organization and lased course s  / Self study ents	ilities, logical and coherent thinking. Show presentational skills are minimally effective o  Details  Details  Coursework (assignments,	very little or no ability to apprineffective.  Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activities Lectures Tutorials Reading Methods  Assignme Examinat Arthur W. McGill, D. William H	problems. Organization and passed course s  / Self study  ents tion Anderson: Pension Matr. M., Brown, K.N., Haley, Aitken: Problem-Solving	Details  Details  Coursework (assignments, tutorials, and a class test) One 3-hour written examination nematics for Actuaries (2006, 3rd ed J.J., Schieber, S.J.: Fundamentals of Approach to Pension Funding and	Weighting in final course grade (%)  25  75  ition). of Private Pensions (2010 Valuation, (2nd edition).	No. of Hours  36 12 100 Assessment Methods to CLO 1,2,3,4,5,6 CLO 1,2,3,4,6		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activities Lectures Tutorials Reading Methods  Assignme Examinat Arthur W. McGill, D. William H Morneau Actuarial Actuarial Measuring Actuarial David Far Cost Mett 2001 Sup	ents  tion Anderson: Pension Matt. M., Brown, K.N., Haley, Aitken: Problem-Solving Sobeco: Handbook of Ca Standard of Practice No. Standard of Practice No. Standard of Practice No. Pension Obligations Standard of Practice No. Total Problem-Solving Pension Obligations Standard of Practice No. Total	Details  Details  Coursework (assignments, tutorials, and a class test) One 3-hour written examination nematics for Actuaries (2006, 3rd ed J.J., Schieber, S.J.: Fundamentals of Approach to Pension Funding and anadian Pension & Benefit Plans (2027, Selection of Economic Assumpt lo. 35, Selection of Demographic  44, Selection and Use of Asset Valuation, 1999, ACTEX Publications t Methods-A Review, ACTEX Publications to Methods-A Review, ACTEX Publications	Weighting in final course grade (%)  25  75  lition). of Private Pensions (2010 Valuation, (2nd edition). 1008, 14th Edition) tions for Measuring Pension and Other Noneconomic aution Methods for Pensionyer, MSPA, George Matralations	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,6 , 9th Edition) on Obligations c Assumptions fo n Valuations ay, FSPA: Actuaria		
Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Lectures Tutorials Reading Methods  Assignme Examinat Arthur W. McGill, D. William H Morneau Actuarial Actuarial Actuarial Actuarial Cost Methods AC M C	ents  tion Anderson: Pension Matt. M., Brown, K.N., Haley, Aitken: Problem-Solving Sobeco: Handbook of Ca Standard of Practice No. Standard of Practice No. Standard of Practice No. Pension Obligations Standard of Practice No. Total Problem-Solving Pension Obligations Standard of Practice No. Total	Details  Details  Coursework (assignments, tutorials, and a class test) One 3-hour written examination nematics for Actuaries (2006, 3rd ed J.J., Schieber, S.J.: Fundamentals of Approach to Pension Funding and anadian Pension & Benefit Plans (2027, Selection of Economic Assumpt lo. 35, Selection of Demographic 44, Selection and Use of Asset Valudilliam Farrimond, FSPA, Duane Macon, 1999, ACTEX Publications	Weighting in final course grade (%)  25  75  lition). of Private Pensions (2010 Valuation, (2nd edition). 1008, 14th Edition) tions for Measuring Pension and Other Noneconomic aution Methods for Pensionyer, MSPA, George Matralations	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,6 , 9th Edition) on Obligations c Assumptions for n Valuations ay, FSPA: Actuaria		

STAT4601	Time-ser	ies analysis (6 cred	lits)	Academic Yea	<b>r</b> 2017		
Offering Department	Statistics 8	& Actuarial Science		Quota			
Course Co-ordinator	Dr G Li, St	atistics & Actuarial Scie	nce (gdli@hku.hk)				
Teachers Involved	(Dr G Li,St	atistics & Actuarial Scie	nce)				
Course Objectives	climatology series are different ty	time series consists of a set of observations on a random variable taken over time. Time series arise naturally in imatology, economics, environment studies, finance and many other disciplines. The observations in a time eries are usually correlated; the course establishes a framework to discuss this. This course distinguishes ifferent type of time series, investigates various representations for the processes and studies the relative merits of different forecasting procedures. Students will analyse real time-series data on the computer. Itationarity and the autocorrelation functions; linear stationary models; linear non-stationary modes; model					
Course Contents & Topics		,	ion functions; linear stationary mostic checking; seasonal models a	•	,		
Course Learning			ourse, students should be able to:	<u> </u>			
Outcomes	CLO 1 recognize a stationary vs non-stationary time series  CLO 2 understand some basic properties of commonly used time series models such as AR (autoregressiv (moving average) and ARMA models  CLO 3 transform non-stationary time series into stationary ones  CLO 4 identify different time series models based on autocorrelation functions  CLO 5 fit a suitable AR, MA or ARMA model to real data using SAS (after transforming to stationarity if nec						
	CLO 6 pe	rform goodness of fit tes	sts for such models				
	CLO 7 do	forecasting with these f	itted time series models				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3600; and Not for students who have passed in STAT3614, or have already enrolled in this course; and Not for students who have passed in STAT3907, or have already enrolled in this course.						
Offer in 2017 - 2018	Y 1st sem Offer in 2018 - 2019 : Y Examination Dec				Dec		
Grade Descriptors (A+ to F)	B C	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilito apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational are presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cours learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar own unfamiliar situations. Apply effective organizational and presentational skills.					
	D Fail	familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited abilities, Show limited abilities, Show limited abilities, Show limited abilities or solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lac of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solv					
Course Tune	Looturo ba		presentational skills are minimally effective of	ог іпенестіле.			
Course Type Course Teaching	Activities	ised course	Deteile		No. of Hours		
& Learning Activities	Lectures		Details		No. of Hours 36		
- Louining Activities	Tutorials				12		
		Self study			100		
Accessment Matheda		Sell Study		144 1 1 41 1 1 61 1			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme		Coursework (assignments, tutorials, and a class test)	40	CLO 1,2,3,4,5,6,7		
	Examinati		One 2-hour written examination	60	CLO 1,2,3,4,6,7		
Required/recommended reading and online materials	Bovas Abr W. W .S. V W. K. Li: D	aham & Johannes Ledo Vei: Time Series Analys riagnostic Checks in Tim	ries Analysis with Applications in Roller: Statistical Methods for Forecasis: Univariate and Multivariate Methore Series (Chapman & Hall/CRC, 20ies: A Dynamical System Approach	ting (John Wiley & Sons, 2 ods (Addison-Wesley, 2000 004)	005, 2nd edition) 6, 2nd edition)		
Course Website	moodle.hk	u.hk					

STAT4602	Multivariate data analysis (6 credits)  Academic Year 2017						
Offering Department	Statistics & Actuarial Science	Quota	50				
Course Co-ordinator	Prof T W K Fung, Statistics & Actuarial Science (wingfung@hku.hk)						
Teachers Involved	Prof T W K Fung, Statistics & Actuarial Science)						
In many designed experiments or observational studies, the researchers are dealing with multivariat each observation is a set of measurements taken on the same individual. These measurements correlated. The correlation prevents the use of univariate statistics to draw inferences. This course statistical methods for analysing multivariate data through examples in various fields of application experience with the statistical software SAS.							
Course Contents & Topics	Problems with multivariate data. Multivariate normality and transforms. Mean structure for one sample. Tests of covariance matrix. Correlations: Simple, partial, multiple and canonical. Multivariate regression. Principal components analysis. Factor analysis. Problems for means of several samples. Multivariate analysis of variance. Discriminant analysis. Classification. Multivariate linear model.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 analyze multivariate data with main SAS procedures, such as PROC PROC CANCORR, PROC PRINCOMP, PROC FACTOR, PROC DISCR	,	, ,				
	CLO 2 compare the mean structure of multiple measurements for one or multivariate MANOVA and profile analysis	more than one p	population(s) by				
	CLO 3 investigate the linear associations among one/two group(s) of variables correlation and multivariate regression	by multiple, parti	al and canonical				
	CLO 4 explore the latent linear structure of a data set with multiple measur	ements by princi	pal components				

Pre-requisites (and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018  Grade Descriptors (A+ to F)  A Demonstrate thoror learning outcomes. (and Co-requisites A Demonstrate substrate and some unfamiliar C Demonstrate gener  C Demonstrate gener outcomes. Show evidence of solve Fail Demonstrate little of analytical and company to the	s of a population with one or more than or 3907  O18 - 2019 : Y  Igh mastery at an advanced level of extensive kno Show strong analytical and critical abilities and logic to a wide range of complex, familiar and unfamili	Examination owledge and skills required for cal thinking, with evidence of or liar situations. Apply highly effet d skills required for attaining at logical thinking, and ability to an intational skills. ixills required for attaining mos logical thinking, and ability to a tational skills. irred for attaining some of the ci nalytical and critical abilities. Sh ional and presentational skills. required for attaining the course w very little or no ability to a	May  attaining all the course iginal thought, and ability active organizational and least most of the course poply knowledge to familiar tof the course learning apply knowledge to most ourse learning outcomes, ow limited ability to apply learning outcomes. Lack		
Pre-requisites (and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018  Grade Descriptors (A+ to F)  A Demonstrate thorol learning outcomes. (A+ to F)  B Demonstrate substrant substrant substrant substrant substrant substrant success.  C Demonstrate gener outcomes. Show ever familiar situations. A  D Demonstrate gener outcomes. Show evidence of sknowledge to solve  Fail Demonstrate jentral Show evidence of sknowledge to solve  Fail Demonstrate illite of analytical and corroblems. Organizate  Course Type Course Teaching & Learning Activities  Lectures Tutorials Reading / Self study  Methods	2018 - 2019 : Y  Igh mastery at an advanced level of extensive known shows strong analytical and critical abilities and logic to a wide range of complex, familiar and unfamiliar and unfamiliar and critical abilities and resituations. Apply effective organizational and present all but incomplete command of knowledge and skidence of some analytical and critical abilities and upply moderately effective organizational and present but limited command of knowledge and skills requipme coherent and logical thinking, but with limited an problems. Apply limited or barely effective organization or ovidence of command of knowledge and skills re no evidence of command of knowledge and skills roughly initical abilities, logical and coherent thinking. Show tion and presentational skills are minimally effective or	Examination owledge and skills required for cal thinking, with evidence of or liar situations. Apply highly effet d skills required for attaining at logical thinking, and ability to an intational skills. ixills required for attaining mos logical thinking, and ability to a tational skills. irred for attaining some of the ci nalytical and critical abilities. Sh ional and presentational skills. required for attaining the course w very little or no ability to a	May rattaining all the course iginal thought, and ability ective organizational and least most of the course oply knowledge to familia t of the course learning apply knowledge to most ourse learning outcomes ow limited ability to apply learning outcomes. Lack oply knowledge to solve		
Grade Descriptors (A+ to F)  A Demonstrate thoron learning outcomes. to apply knowledge presentational skills B Demonstrate substrate and some unfamiliar situations. A Demonstrate generoutcomes. Show enfamiliar situations. A Demonstrate partiangle of substrate partiangl	igh mastery at an advanced level of extensive know strong analytical and critical abilities and logic to a wide range of complex, familiar and unfamiliantial command of a broad range of knowledge and Show evidence of analytical and critical abilities and restraints as a straint of the command of knowledge and skildence of some analytical and critical abilities and upply moderately effective organizational and present but limited command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills repuired to evidence of command of knowledge and skills repuired to evidence of command of knowledge and skills required to evidence of command of knowledge and skills repuired abilities, logical and coherent thinking. Show tion and presentational skills are minimally effective or the control of the	owledge and skills required for cal thinking, with evidence of or liar situations. Apply highly effect diskills required for attaining at logical thinking, and ability to a printational skills. It is required for attaining mos logical thinking, and ability to a tational skills. It is tational skills are diskills and critical abilities. Shi conal and presentational skills. required for attaining the course we very little or no ability to a tational skills.	attaining all the course iginal thought, and ability active organizational and least most of the course poly knowledge to familia tof the course learning apply knowledge to most purse learning outcomes ow limited ability to apply knowledge to solve		
(A+ to F)    learning outcomes. to apply knowledge presentational skills     B	Šhow strong analytical and critical abilities and logic to a wide range of complex, familiar and unfamiliantial command of a broad range of knowledge and Show evidence of analytical and critical abilities and restuations. Apply effective organizational and present al but incomplete command of knowledge and skridence of some analytical and critical abilities and apply moderately effective organizational and present but limited command of knowledge and skills required one coherent and logical thinking, but with limited an problems. Apply limited or barely effective organization or evidence of command of knowledge and skills re no evidence of command of knowledge and skills routed and presentational skills are minimally effective organization and presentational skills are minimally effective or an experience of command of knowledge and skills are minimally effective or an experience of command of knowledge and skills are minimally effective or an experience of command of knowledge and skills are minimally effective or an experience of command of knowledge and skills are minimally effective or an experience of command of knowledge and skills are minimally effective or an experience of command of knowledge and skills are minimally effective or an experience of command of knowledge and skills are minimally effective or an experience of command of knowledge and skills are minimally effective or an experience of command of knowledge and skills are minimally effective or an experience of command or an experience or an experience of command or an experience or an experience of command or an experience or an experience or an experience o	cal thinking, with evidence of or liar situations. Apply highly effect d skills required for attaining at logical thinking, and ability to an intational skills. ixills required for attaining mos logical thinking, and ability to a tational skills. irred for attaining some of the cunalytical and critical abilities. Shi lonal and presentational skills. required for attaining the course w very little or no ability to a wery little or no ability to a tational skills.	iginal thought, and ability active organizational and least most of the course oply knowledge to familial tof the course learning apply knowledge to most ourse learning outcomes ow limited ability to apply learning outcomes. Lack oply knowledge to solve		
learning outcomes. and some unfamilia	Show evidence of analytical and critical abilities and r situations. Apply effective organizational and preser all but incomplete command of knowledge and sk idence of some analytical and critical abilities and apply moderately effective organizational and present but limited command of knowledge and skills requi ome coherent and logical thinking, but with limited an problems. Apply limited or barely effective organization or no evidence of command of knowledge and skills r no evidence of sommand of knowledge and skills r no evidence of sommand of knowledge and skills r no evidence of sommand of knowledge and skills titical abilities, logical and coherent thinking. Show tion and presentational skills are minimally effective or the strength of the strength of	logical thinking, and ability to ap ntational skills. ills required for attaining mos logical thinking, and ability to a tational skills. irred for attaining some of the con nalytical and critical abilities. Shi onal and presentational skills. required for attaining the course were very little or no ability to ag	oply knowledge to familia t of the course learning apply knowledge to mos ourse learning outcomes ow limited ability to apply learning outcomes. Lacl oply knowledge to solve		
outcomes. Show en familiar situations. A D Demonstrate partial Show evidence of s knowledge to solve  Fail Demonstrate little of showledge to solve of analytical and coproblems. Organizate Course Type  Course Type Lecture-based course  Course Teaching Activities  Lectures Tutorials  Reading / Self study  Assessment Methods  Outcomes. Show en familiar situations. A problems. Organizate Course of analytical and coproblems. Organizate Course of analytical analyt	ridence of some analytical and critical abilities and pply moderately effective organizational and present but limited command of knowledge and skills requi ome coherent and logical thinking, but with limited an problems. Apply limited or barely effective organization or no evidence of command of knowledge and skills ritical abilities, logical and coherent thinking. Show tion and presentational skills are minimally effective or possible.	logical thinking, and ability to a tational skills. irred for attaining some of the cunalytical and critical abilities. Shi onal and presentational skills. required for attaining the course we very little or no ability to ag	apply knowledge to most ourse learning outcomes ow limited ability to apply learning outcomes. Lack oply knowledge to solve		
Show evidence of s knowledge to solve  Fail Demonstrate little o of analytical and o problems. Organiza  Course Type Lecture-based course  Course Teaching Activities Lectures Tutorials Reading / Self study  Assessment Methods  Show evidence of s knowledge to solve Activities Lectures Tutorials Reading / Self study	ome coherent and logical thinking, but with limited an problems. Apply limited or barely effective organization r no evidence of command of knowledge and skills re ritical abilities, logical and coherent thinking. Show tion and presentational skills are minimally effective or the contract of the	nalytical and critical abilities. Sh ional and presentational skills. required for attaining the course w very little or no ability to ap	low limited ability to apply learning outcomes. Lack oply knowledge to solve		
Fail Demonstrate little of analytical and corproblems. Organizate  Course Type Lecture-based course  Course Teaching Activities  Lectures Tutorials Reading / Self study  Assessment Methods  Fail Demonstrate little of of analytical and corproblems. Organizate  Activities  Lectures Tutorials Reading / Self study  Methods	no evidence of command of knowledge and skills n ritical abilities, logical and coherent thinking. Show tion and presentational skills are minimally effective of	required for attaining the course w very little or no ability to ap	oply knowledge to solve		
Course Teaching & Learning Activities Lectures Tutorials Reading / Self study  Assessment Methods  Activities Lectures Tutorials Reading / Self study	Details		No. of Hours		
& Learning Activities  Lectures Tutorials Reading / Self study  Assessment Methods  Methods	Details		No. of Hours		
Tutorials Reading / Self study  Assessment Methods  Methods			ito. o. ilouio		
Reading / Self study  Assessment Methods  Methods			36		
Assessment Methods Methods			12		
	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
Assignments	Coursework (assignments, tutorials, and a class test)	50	CLO 1,2,3,4,5		
Examination	One 3-hour written examination	50	CLO 1,2,3,4,5		
reading and online materials  Mardia K. V., Kent J. T., an Seber G. A. F.: Multivariate Morrison D. F.: Multivariate Hair J. F., Anderson R. E.,	Johnson, R. A. & Wichern, D. W.: Applied Multivariate Statistical Analysis (Prentice-Hall, 2007, 6th edition) Mardia K. V., Kent J. T., and Bibby J. M.: Multivariate Analysis (Academic Press, 1979) Seber G. A. F.: Multivariate Observations (John Wiley & Sons, 1984) Morrison D. F.: Multivariate Statistical Methods (McGraw-Hill, 1990, 3rd ed.) Hair J. F., Anderson R. E., Tatham R. L., & Black W. C.: Multivariate Data Analysis (Prentice-Hall, 2006, 6th edition Srivastava M. S.: Methods of Multivariate Statistics (John Wiley and Sons, 2002)				
Course Website moodle.hku.hk					

STAT4603	Current	t topics in risk mana	gement (6 credits)	Academic Yea	r 2017		
Offering Department	Statistics	& Actuarial Science		Quota			
Course Co-ordinator	Dr K P W	/at, Statistics & Actuarial	Science (watkp@hku.hk)				
Teachers Involved	(Dr K P V	Vat, Statistics & Actuarial	Science)				
Course Objectives	manager	course is to broaden the students knowledge of risk management by considering current topics in risk agement. These topics will build on the theory and methods covered in the core courses. The topics offered year depend on staff availability.  idity risk; Operational risk; Model risk; Enterprise risk management; Cutting edge risk analytics and innovations					
Course Contents & Topics	' '	risk; Operational risk; Mo anagement.	odel risk; Enterprise risk manaç	gement; Cutting edge risk analyti	ics and innovation		
Course Learning	On succe	essful completion of this of	course, students should be able	e to:			
Outcomes	CLO 1 gain insights into current advances in risk management						
	CLO 2 understand current risk management pitfalls and development						
	CLO 3	make effective use of m	nodels and techniques for man	aging various kinds of risk			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	STAT3618 and STAT460	1				
Offer in 2017 - 2018	Y 2n	d sem Offer in 2018 - 2	2019 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	trong analytical and critical abilities ar	ive knowledge and skills required for a nd logical thinking, with evidence of origi unfamiliar situations. Apply highly effect	inal thought, and abilit		
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the coulearning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiand some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to mo familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Show evidence of some col		s required for attaining some of the cou nited analytical and critical abilities. Show anizational and presentational skills.			
	Fail						
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials	<b>,</b>			12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		

	Assignments	Coursework (assignments, tutorials, class test(s) and project (s))	50	CLO 1,2,3	
	Examination	One 2-hour written examination	50	CLO 1,2,3	
Required/recommended reading and online materials	Dowd, K: Measuring Market Risk. 2nd Edition (Wiley, 2005). (Chapters 14, 16) Fiedler, R.: Liquidity Modelling. (Risk Books, 2011) Franzetti, C.: Operational Risk Modeling and Management. (Chapman & Hall/CRC Finance Series, 2010) Basel Committee on Banking Supervision:Basel III: International Framework for liquidity risk measureme standards and monitoring (BIS, 2010) Basel Committee on Banking Supervision:Basel III: A global regulatory framework for more resilient banks a banking systems (BIS, 2010)				
Course Website	moodle.hku.hk				

STAT4606	Risk ma	•	el Accords in banking and fin	ance	Academic Year	2017	
Offering Department		& Actuarial Science			Quota		
Course Co-ordinator		Ir P K Y Pang, Statistics & Actuarial Science (the_pang@yahoo.com)					
Teachers Involved		Pang, Statistics & Actua		,			
Course Objectives			edge and in-depth understanding of	risk man	agement in the ba	nking and financ	
	industry to students. The focus is on management with basic measurement fundamentals only forming a part of the course. Accordingly, minimal background in quantitative methods will be required and involved. However, basic						
	financial product (eg: bonds, swaps, options) knowledge will be required.						
Course Contents & Topics	The course introduces and explains: - the importance of risk management, - risk nature and types, - design and establishment of a risk management framework, - the importance of people and corporate culture, - the complete risk management cycle, - measurement and management of credit, market and operational risks, - Basel accords and the capital treatments for credit, market and operational risks, - key developments (eg: Know-Your-Customers, Anti-Money laundering, Sarbanes-Oxley) and critical issues,						
		rtance of business conti					
Course Learning			business continuity plan.				
Course Learning Outcomes	CLO 1 un		course, students should be able to: ee, nature and classification of vario	ous risks,	and the risk man	agement principle	
			k management framework				
		•	nd understanding of the measureme	ents of cre	edit, market and or	perational risks	
			el accords and its capital treatments				
	CLO 5 ap	preciate the importance	of, design and implement a busines	ss continu	ity plan		
Pre-requisites (and Co-requisites and Impermissible combinations)			or STAT3905 or (FINA2322 and any	/ Universi	,		
Offer in 2017 - 2018		sem Offer in 2018 - 2			Examination	May	
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail	of analytical and critical a	dence of command of knowledge and skills robilities, logical and coherent thinking. Show presentational skills are minimally effective of	very little	or no ability to apply		
Course Type		ased course					
Course Teaching	Activities		Details			No. of Hours	
& Learning Activities	Lectures					36	
	Tutorials	0.16.1.1				12	
		Self study				100	
Assessment Methods and Weighting	Methods		Details		hting in final se grade (%)	Assessment Methods to CLO Mapping	
	Assignme		Coursework (assignments, tutorials, and a class test)		40	CLO 1,2,3,4	
	Examinat		One 2-hour written examination		60	CLO 1,2,3,4,5	
Required/recommended reading and online materials	Jorion, P.: Hull, J. C.: Gallati, R.	Financial Risk Manage Risk Management and Risk Management and	<ul> <li>The Essentials of Risk Managemer r Handbook + Test Bank: FRM part Financial Institutions (Pearson High Capital Adequacy (McGrawHill, 200</li> </ul>	I/Part II (\ ner Educa	Viley, 2010, 6th ed		
Course Website	moodle.hk						
Additional Course Information	This cours	e is previously called S	TAT2320 as the prerequisite change	ed to STA	Т3303.		

STAT4607	Credit risk analysis (6 credits)	Academic Year	2017	

Statistics	& Actuarial Science		atistics & Actuarial Science Quota			
Dr K P Wa	at, Statistics & Actuarial	Science (watkp@hku.hk)	·	·		
(Dr K P W	Dr K P Wat,Statistics & Actuarial Science)					
other coul change in measuring	For a commercial bank, credit risk has always been the most significant. It is the risk of default on debt, swap, or other counterparty instruments. Credit risk may also result from a change in the value of an asset resulting from a change in the counterparty's creditworthiness. This course will introduce students to quantitative models for measuring and managing credit risk. It also aims to provide students with an understanding of the credit risk medalogy used in the financial industry and the regulatory framework in which the credit risk models operate.					
Probabiliti internal ra	Probabilities of default, recovery rates and loss given default; Default and credit migration; credit scoring and nternal rating models; Credit portfolio models such as CreditMetrics, CreditPortfolioView, KMV and actuarial					
		course, students should be able to:				
CLO 1 ur	nderstand the Basel requ	uirements for credit risk				
CLO 3 ur	nderstand and estimate		approaches such as Mo	ody's KMV and the		
CLO 4 ur	nderstand the concept of	f credit value-at-risk and the CreditM	etrics approach			
		ns				
	CLO 6 assess rating systems Pass in STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any University level 3 course)					
Y 1st	sem Offer in 2018 - 20	019 : Y	Examination	Dec		
A	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and					
B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cours learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familia						
C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve						
Locturo b		presentational skills are minimally effective of	or ineffective.			
		Dotaile		No. of Hours		
		Details	36			
			12			
				100		
Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
Assignme	ents	Coursework (assignments, tutorials, and class test(s))	40	CLO 1,2,3,4,5,6		
		One 2-hour written examination	60	CLO 1,2,3,4,5,6		
Models to Saunders Value at F Loffler, G. Jorion, P. Crouhy, M Hull, J. C.	Resti, A. and Sironi, A. (2007). Risk Management and Shareholders' Value in Banking: From Risk Measurement Models to Capital Allocation Policies. Wiley.  Saunders, A. and Allen, L. (2010). Credit Risk Measurement In and Out of the Financial Crisis: New Approaches to Value at Risk and Other Paradigms (3rd Edition). Wiley.  Loffler, G. and Posch, P. N. (2010). Credit Risk Modeling using Excel and VBA (2nd Edition). Wiley.  Jorion, P. (2011). Financial Risk Manager Handbook (6th Edition). Wiley.  Crouhy, M., Galai, D., and Mark, R. (2001). Risk Management. McGraw-Hill.					
	Dr K P W. (Dr K P W. (Dr K P W. (Dr K P W. For a con other cou change in measuring methodole Probabilit internal ra approach On succe CLO 1 ur CLO 2 es CLO 3 ur CLO 4 ur CLO 5 es CLO 6 as Pass in S  Y 1st  A  B  C  D  Fail  Lecture-b  Activities Lectures Tutorials Reading Methods  Assignme Examinat Resti, A. Models to Saunders Value at F Loffler, G. Crouhy, R Hull, J. C.	(Dr K P Wat, Statistics & Actuarial For a commercial bank, credit risiother counterparty instruments. On the counterparty instruments. On the counterparty in the financial Probabilities of default, recovery internal rating models; Credit possibilities of default, recovery internal rating models; Credit possibilities. On successful completion of this of CLO 1 understand the Basel requivatives.  On successful completion of this of CLO 1 understand the Basel requivatives.  On successful completion of this of CLO 2 estimate credit scores using CLO 3 understand the concept of CLO 5 estimate default correlation of CLO 4 understand the concept of CLO 5 estimate default correlation of CLO 6 assess rating systems.  Pass in STAT3618 or STAT3905  Y 1st sem Offer in 2018 - 20 A Demonstrate thorough mast learning outcomes. Show and some unfamiliar situations. Apply mast learning outcomes. Show evidence familiar situations. Apply more of analytical and critical a problems. Organization and problems. Organization and critical and critical and problems. Organization and critical and problems. Organization and critical and critical and problems. Organization and critical and critical and critical and problems. Organization and critical and cri	Dr K P Wat, Statistics & Actuarial Science (watkp@hku.hk) (Dr K P Wat, Statistics & Actuarial Science) For a commercial bank, credit risk has always been the most signific other counterparty instruments. Credit risk may also result from a change in the counterparty's creditworthiness. This course will interest measuring and managing credit risk. It also aims to provide stude methodology used in the financial industry and the regulatory framework probabilities of default, recovery rates and loss given default; Defainternal rating models; Credit portfolio models such as CreditMerrapproach; Credit derivatives.  On successful completion of this course, students should be able to: CLO 1 understand the Basel requirements for credit risk CLO 2 estimate credit scores using the logit model CLO 3 understand and estimate default probabilities using various mortality method  CLO 4 understand the concept of credit value-at-risk and the CreditM CLO 5 estimate default correlations  CLO 6 assess rating systems  Pass in STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any STAT3618 or STAT3618 or STAT3910 or STAT3910 or (FINA2322 and any STAT3618 or STAT3618 or STAT3910 or STAT3910 or (FINA2322 and any STAT3618 or STAT3910 or STAT3910 or (FINA2322 and any STAT3618 or STAT3910 or STAT3910 or (FINA2322 and any STAT3618 or STAT3910 or STAT3910 or (FINA2322 and any STAT3618 or STAT3618 or STAT3910 or S	Or K P Wat, Statistics & Actuarial Science (watkp@hku.hk) (Or K P Wat, Statistics & Actuarial Science) For a commercial bank, credit risk has always been the most significant. It is the risk of defat other counterparty instruments. Credit risk may also result from a change in the value of an atchange in the counterparty's credit/worthiness. This course will introduce students to qual measuring and managing credit risk. It also aims to provide students with an understandir methodology used in the financial industry and the regulatory framework in which the credit risk Probabilities of default, recovery rates and loss given default; Default and credit migration; internal rating models; Credit portfolio models such as CreditMetrics, CreditPortfolioView, approach; Credit derivatives.  On successful completion of this course, students should be able to:  CLO 1 understand the Basel requirements for credit risk  CLO 2 estimate credit scores using the logit model  CLO 3 understand and estimate default probabilities using various approaches such as Mormortality method  CLO 4 understand the concept of credit value-at-risk and the CreditMetrics approach  CLO 5 estimate default correlations  CLO 6 assess rating systems  Pass in STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any University level 3 course  Y 1st sem Offer in 2018 - 2019 : Y  A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of or to apply knowledge to a vide range of complex, familiar and unfamiliar situations. Apply reflective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining most familiar situations. Apply reflective organizational and presentational skills.  B Demonstrate situations Show evidence of analytical and critical abilities and logical thinking, and ability to a part of the proper should be problems. Apply		

STAT4608	Market r	Academic Year	2017					
Offering Department	Statistics	Actuarial Science	Quota					
Course Co-ordinator	Dr Z Zhan	Dr Z Zhang, Statistics & Actuarial Science (zhangz08@hku.hk)						
Teachers Involved	(Dr Z Zhai	g,Statistics & Actuarial S	Science)					
Course Objectives	Financial risk management has experienced a revolution in the last decade thanks to the introduction of new methods for measuring risk, particularly Value-at-Risk (VaR). This course introduces modern risk management techniques covering the measurement of market risk using VaR models and financial time series models, and stress testing.							
Course Contents & Topics	Risk Measures; Value-at-Risk (VaR) models (parametric, Monte Carlo simulation and Historical simulation); Risk factor mapping; Advanced VaR models (GARCH-type models, extreme-value theory and normal-mixture); Principal Component Analysis and VaR; Backtesting and stress testing.							
Course Learning	On succes	sful completion of this co	ourse, students should be able to:					
Outcomes	CLO 1 understand VaR and expected shortfall as risk measures							
	CLO 2	compute VaR and ex	pected shortfall					
	CLO 3	CLO 3 model volatility using GARCH-type models						
	CLO 4 understand extreme-value theory							
	CLO 5 understand backtesting and stress testing							

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3907 and STAT3910; or Pass in STAT4601 and (FINA2320 or STAT3609)					
Offer in 2017 - 2018	Y 2r	d sem Offer in 2018 -	2019 : Y	Exam	ination	May
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of extensive strong analytical and critical abilities and l wide range of complex, familiar and unfa	ogical thinking, with evide	nce of origina	al thought, and ability
	В	learning outcomes. Show e	ommand of a broad range of knowledge evidence of analytical and critical abilities a ions. Apply effective organizational and pr	and logical thinking, and a		
	С	outcomes. Show evidence	incomplete command of knowledge and of some analytical and critical abilities a oderately effective organizational and pre-	and logical thinking, and a		
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no ev of analytical and critical a	idence of command of knowledge and ski abilities, logical and coherent thinking. S d presentational skills are minimally effect	lls required for attaining the show very little or no ab	ne course lear	
Course Type	Lecture-I	pased course	· · · · · · · · · · · · · · · · · · ·			
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Reading	/ Self study				100
Assessment Methods and Weighting	Method	S	Details	Weighting in course grad	e (%)	Assessment Methods o CLO Mapping
	Assignm	ents	Coursework (assignments, tutorials, and a class test)	40		CLO 1,2,3,4,5
	Examina	ation	One 2-hour written examination	n 60		CLO 1,2,3,4,5
Required/recommended reading and online materials	Alexande Alexande Alexande	Jorion, P.: Value-at-Risk: The New Benchmark for Managing Financial Risk (McGraw-Hill, 2007, 3rd edition)  Alexander, C.: Market Models: A Guide to Financial Data Analysis (Wiley, 2001)  Alexander, C.: Market Risk Analysis: Practical Financial Econometrics (Wiley, 2008)  Alexander, C.: Market Risk Analysis: Value-at-Risk Models (Wiley, 2009)  Tsay, R. S.: Analysis of Financial Time Series (Wiley, 2005, 2nd edition)				
Course Website	moodle.h	,	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,		

STAT4609	Big dat	ta analytics (6 c	credits)	Academic Yea	r 2017		
Offering Department	Statistics	Statistics & Actuarial Science Quota					
Course Co-ordinator	Dr G C S	Dr G C S Lui, Statistics & Actuarial Science (csqlui@hku.hk)					
Teachers Involved	(Dr G C	S Lui, Statistics & A	Actuarial Science)				
Course Objectives	social w	In the past decade, huge volume of data with highly complicated structure has appeared in every aspect, such as social web logs, e-mails, video, speech recordings, photographs, tweets and others. The efficient extraction of valuable information from these data sources becomes a challenging task. This course focuses on the practical knowledge and skills of some advanced analytics and statistical modeling for solving big data problems.					
Course Contents & Topics	Web and	Web analytics, text analytics, sentiment analytics, link analysis, social network analysis, recommender systems (collaborative filtering), and parallel computing for big data analytics					
Course Learning	On succ	essful completion of	of this course, students should be	able to:			
Outcomes		understand and apstrengths and weak		ytic techniques, and recognize the	eir characteristics,		
	CLO 2	obtain hands-on ex	perience of computer software for	data analytics			
			ppropriate data analytic techniquation and the goals of the user of the	les for data extraction, taking into discovered knowledge	account both the		
			y of discovered knowledge, takin ed and the goals of the user	g into account the requirements o	f the data analytic		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	Pass in STAT3612					
Offer in 2017 - 2018	Y 2r	nd sem Offer in 2	018 - 2019 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	learning outcomes.	Show strong analytical and critical abilities to a wide range of complex, familiar a	tensive knowledge and skills required for a sand logical thinking, with evidence of origind unfamiliar situations. Apply highly effective the same street or the same street is a same street or the same s	inal thought, and ability		
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С						
			vidence of some analytical and critical ab	pilities and logical thinking, and ability to ap	of the course learning		
	D	familiar situations. A Demonstrate partia Show evidence of s	vidence of some analytical and critical ab Apply moderately effective organizational a I but limited command of knowledge and	olitities and logical thinking, and ability to ap and presentational skills. skills required for attaining some of the cou th limited analytical and critical abilities. Sho	of the course learning oply knowledge to mos		
	D Fail	familiar situations. A Demonstrate partia Show evidence of s knowledge to solve Demonstrate little o of analytical and o	vidence of some analytical and critical at Apply moderately effective organizational at I but limited command of knowledge and some coherent and logical thinking, but wit problems. Apply limited or barely effective or no evidence of command of knowledge	Dilities and logical thinking, and ability to an and presentational skills. skills required for attaining some of the couth the limited analytical and critical abilities. Sho e organizational and presentational skills. and skills required for attaining the course liking. Show very little or no ability to app	of the course learning oply knowledge to mos urse learning outcomes w limited ability to appli earning outcomes. Laci		
Course Type	Fail	familiar situations. A Demonstrate partia Show evidence of s knowledge to solve Demonstrate little o of analytical and o	vidence of some analytical and critical at Apply moderately effective organizational I but limited command of knowledge and some coherent and logical thinking, but wit problems. Apply limited or barely effective or no evidence of command of knowledge critical abilities, logical and coherent thin	Dilities and logical thinking, and ability to an and presentational skills. skills required for attaining some of the couth the limited analytical and critical abilities. Sho e organizational and presentational skills. and skills required for attaining the course liking. Show very little or no ability to app	of the course learning oply knowledge to mos urse learning outcomes w limited ability to appli earning outcomes. Laci		
7	Fail	familiar situations. A Demonstrate partia Show evidence of s knowledge to solve Demonstrate little o of analytical and o problems. Organiza based course	vidence of some analytical and critical at Apply moderately effective organizational I but limited command of knowledge and some coherent and logical thinking, but wit problems. Apply limited or barely effective or no evidence of command of knowledge critical abilities, logical and coherent thin	Dilities and logical thinking, and ability to an and presentational skills. skills required for attaining some of the couth the limited analytical and critical abilities. Sho e organizational and presentational skills. and skills required for attaining the course liking. Show very little or no ability to app	of the course learning oply knowledge to mos urse learning outcomes w limited ability to appli earning outcomes. Laci		
Course Teaching	Fail Lecture-	familiar situations. A Demonstrate partia Show evidence of s knowledge to solve Demonstrate little o of analytical and o problems. Organiza based course	vidence of some analytical and critical at Apply moderately effective organizational a I but limited command of knowledge and some coherent and logical thinking, but wit problems. Apply limited or barely effective r	Dilities and logical thinking, and ability to an and presentational skills. skills required for attaining some of the couth the limited analytical and critical abilities. Sho e organizational and presentational skills. and skills required for attaining the course liking. Show very little or no ability to app	of the course learning ply knowledge to mos arse learning outcomes w limited ability to apply earning outcomes. Lacily knowledge to solve		
Course Teaching	Fail Lecture-	familiar situations. A Demonstrate partia Show evidence of s knowledge to solve Demonstrate little o of analytical and o problems. Organiza based course	vidence of some analytical and critical at Apply moderately effective organizational a I but limited command of knowledge and some coherent and logical thinking, but wit problems. Apply limited or barely effective r	Dilities and logical thinking, and ability to an and presentational skills. skills required for attaining some of the couth the limited analytical and critical abilities. Sho e organizational and presentational skills. and skills required for attaining the course liking. Show very little or no ability to app	of the course learning oply knowledge to mos urse learning outcomes we limited ability to apply sarning outcomes. Lacily knowledge to solve		
Course Type Course Teaching & Learning Activities	Fail Lecture- Activitie Lectures Tutorials	familiar situations. A Demonstrate partia Show evidence of s knowledge to solve Demonstrate little o of analytical and o problems. Organiza based course	vidence of some analytical and critical at Apply moderately effective organizational a I but limited command of knowledge and some coherent and logical thinking, but wit problems. Apply limited or barely effective r	Dilities and logical thinking, and ability to an and presentational skills. skills required for attaining some of the couth the limited analytical and critical abilities. Sho e organizational and presentational skills. and skills required for attaining the course liking. Show very little or no ability to app	of the course learning oply knowledge to mos urse learning outcomes we limited ability to apply sarring outcomes. Lacily knowledge to solve No. of Hours 36		

				to CLO Mapping				
	Assignments		30	CLO 1,2,3,4				
	Project reports		30	CLO 1,2,3,4				
	Test		40	CLO 3,4				
Required/recommended reading and online materials	Tan, P.N., Steinback, M. and Kumar, V.: Introduction to Data Mining (Addison Wesley, 2014, 2nd edition) Hastie, T., Tibshirani R. and Friedeman, J.: The Elements of Statistical Learning: Data Mining, Inference, and Prediction (Springer, New York, 2009, 2nd edition) Liu, B.: Web Data Mining: Exploring Hyperlinks, Contents and Usage Data (Springer, 2013, 2nd edition) Webb, A.: Statistical Pattern Recognition (Wiley, 2011, 3rd edition)							
Course Website	moodle.hku.hk	, , , ,						

STAT4710	Capstor	ne experience for sta	atistics undergraduates (6 cred	lits) Academic Yea	ar 2017		
Offering Department		& Actuarial Science	<u> </u>	Quota	50		
Course Co-ordinator	Prof G Yir	n, Statistics & Actuarial S	Science (ug_enquiry@saas.hku.hk)				
Teachers Involved	(Prof G Yi	(Prof G Yin, Statistics & Actuarial Science)					
Course Objectives	problems research	This project-based course aims to provide students with capstone experience to formulate and investigate real life problems in the area of statistics, risk management, finance, climate, social science, medicine and scientific research by integrating and applying the statistical theories and quantitative techniques learnt in their junior university years.					
Course Contents & Topics	groups of	four or five under the su	expected to devote 120-140 hours w pervision of a teacher. Students are of the semester, and submit their final	equired to give a preser	ntation on their work		
	students t variable(s presentati regarding	to equip with hands-on ) of interest, literature se on of the results. Stude	establish a good and solid foundation experience in solving real life proble earch, model formulation, data analys ents will need to find an interesting to the related to the problem, make sugging in their project.	ems starting from ident is or simulation, technica opic of their own, condu	ification of the key al report writing and act literature search		
Course Learning	On succes	ssful completion of this c	course, students should be able to:				
Outcomes	CLO 1 formulate a problem using statistical or risk management ideas for a particular issue we are facing with and determine ways in which statistics/risk management can be used to solve the problems or to make predictions  CLO 2 integrate theory and practice, and to understand limitations of their current knowledge  CLO 3 work in a team and to collaborate with people with different background						
		•	n both written and oral forms				
		CLO 5 develop further logical, critical thinking, creativity, technical report writing, communication and consultation					
	skills						
Pre-requisites			oreciation of statistics/risk manageme satisfactorily completed at least 2		•		
(and Co-requisites and Impermissible combinations)	taking the This caps mutually e	course should submit the stone course is only for exclusive with STAT3799	ion Analytics/Risk Management/Station in Analytics/Risk Management/Station in Decision Analytics and STAT4799.  The students majoring in Decision Analytics and STAT4799.  The student in the second in the student in the second	alytics/Risk Managemer			
Offer in 2017 - 2018		sem 2nd sem Offer	•	Examination	No Exam		
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course						
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail	of analytical and critical at	dence of command of knowledge and skills req pilities, logical and coherent thinking. Show we presentational skills are minimally effective or its	very little or no ability to app			
Course Type	Project-ba	ased course					
	Activities		Details		No. of Hours		
	Dooding	/ Self study	Tutorials, group work/project, readin	g/self-study	120		
	Reading			Weighting in final			
& Learning Activities Assessment Methods	Methods		Details	course grade (%)	Assessment Methods to CLO Mapping		
& Learning Activities Assessment Methods			oral presentation, progress, attendance, and in-class discussion		Methods to CLO Mapping		
Course Teaching & Learning Activities Assessment Methods and Weighting	Methods	entation	oral presentation, progress, attendance, and in-class	course grade (%)	Methods to CLO Mapping CLO 1,2,3,4,5,6		
& Learning Activities Assessment Methods	Methods  Oral pres  Research  No specifi	entation report ic list of textbooks and r	oral presentation, progress, attendance, and in-class discussion	course grade (%)  50  50  to obtain information vi	Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6		

STAT4711	Capstone experience for actuarial science undergraduates (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	50
Course Co-ordinator	Prof G Yin, Statistics & Actuarial Science (ug_enquiry@saas.hku.hk)		

Teachers Involved	(Prof G Yin, Statistics & Actuaria	al Science)				
Course Objectives	This project-based course aims to provide students with capstone experience to formulate and investigate practical problems in actuarial science by integrating and applying actuarial theories and techniques learnt in their university years. It aims to help the students to establish a good and solid foundation of self-learning skills, and to enable students to equip with hands-on experience in solving practical problems including definition of the problem, designing the solution, and presentation of the results.					
Course Contents & Topics	project. Students will work in supervisor. Students are requir semester, and submit their final	n for this course. Students are expect groups of four or five under the sured to give a presentation on their wor report at the end of the semester.	pervision of a teacher k two to three weeks be	and/or an industry fore the end of the		
	as life insurance, pension, finar also encouraged to suggest to	n this course can be related to any of the nce, investment, enterprise risk managopics in non-traditional actuarial areas topics for this course will be subject to	ement and general insur provided they can find	ance. Students are a suitable teacher		
	activities related to the topic, an	on the topic for a practical project, or d make suggestion on a solution of the				
Course Learning Outcomes	·	s course, students should be able to: blem, discuss the issues faced by dif ns	ferent stakeholders, and	d design workable		
	CLO 2 integrate theoretical res	ults and practical approaches, and to s		nt developments		
		ollaborate with members with different b				
	CLO 4 deliver actuarial results effectively in a written report and in oral presentations CLO 5 develop further logical, critical thinking, creativity, technical report writing, communication and consultation skills					
	CLO 6 explain to a non-actuarial audience the approaches of actuarial science as applied to problems in a financial security system					
Pre-requisites		of advanced level disciplinary core/el	•	Actuarial Science)		
(and Co-requisites and Impermissible combinations)	Pass in STAT3909, or already e This capstone course is only for	STAT3901, or already enrolled in this co enrolled in this course); and or BSc(Actuarial Science) students, an		vith STAT4767 and		
	STAT4798. The earliest that a student is allo	owed to take this capstone course is the	eir vear 3 study			
Offer in 2017 - 2018	Y 1st sem 2nd sem Offe	•	Examination	No Exam		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	of analytical and critical	evidence of command of knowledge and skills re- abilities, logical and coherent thinking. Show and presentational skills are minimally effective or	very little or no ability to app			
Course Type	Project-based course					
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities Assessment Methods	Reading / Self study	Tutorials, group work/project, readir		120		
and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral presentation	oral presentation, progress, attendance and in-class discussion	50	CLO 1,2,3,4,5,6		
	Research report	written report	50	CLO 1,2,3,4,5		
Course Website	moodle.hku.hk					

STAT4766	Statistics internship (6 credits)  Academic Year   2017					
Offering Department	Statistics & Actuarial Science Quota					
Course Co-ordinator	Dr C W Kwan, Statistics & Actuarial Science (cwkwan@hku.hk)					
Teachers Involved	(Various teachers as the assessors of oral presentations and written	n reports, Statistics & Actuarial	Science)			
Course Objectives	This course is offered to students majoring in Decision Analytics/Risk Management/Statistics who take on a minimum of 160 hours of internship work related to his/her major disciplines. It provides students with first-hand experience in the applications of academic knowledge in a real-life work environment.					
Course Contents & Topics	Upon completion of the internship, each student is required to submit a written report and to give a presentation on his/her internship experience. The report should emphasize important working/educational experiences encountered by the student during his/her internship. In many situations, this would mean a report of the project(s) that the student has been involved in during his/her internship.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 gain first-hand work experience in an industry related to decision analytics, risk management or statistics					
	CLO 2 apply knowledge in decision analytics, risk management or statistics to solve practical problems in the work place					
	CLO 3 understand contexts for specific quantitative skills developed in basic decision analytics, risk management or statistics courses					
	CLO 4 communicate specialist knowledge in decision analytics, risk management or statistics to non-experts in a work environment					

Pre-requisites (and Co-requisites	Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Decision Analytics/Risk Management/Statistics Majors.							
and Impermissible combinations)	This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics; and is mutually exclusive with STAT4710.  The earliest that a student is allowed to take this capstone course is their year 3 study.							
Offer in 2017 - 2018	Y 1st s	, , ,						
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass  Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of "Distinction".							
	Fail	by supervisor(s). Fails to	o solve problems in the workplace. Fails to he establish effective collaboration or communic requirements set out in the Course Descrip s), etc.	ation with supervisor(s), other co	lleagues, or clients in the			
Course Type	Internship				No. of Hours			
Course Teaching	Activities		Details	Details				
& Learning Activities	Internship work		it is expected that students are to (or equivalent to 4 weeks full-time	160				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Oral presentation		oral presentation and in-class discussion	40	CLO 1,2,3,4			
	Written rep	oort	written report	60	CLO 1,2,3,4			
Course Website	moodle.hku	u.hk						
Additional Course Information	presentation during the student base Satisfactory be recorded interested to Enrolment	in on their internship internship period (in the sed on the feedback of y completion of this coud and on the student's to to enrol in this course of this course is not	ship, each student is required to be experience. Supervisors will asse the case of internships outside the uppy the external supervisor).  Ourse can be counted towards the Coranscript. This course will be asseshould contact the Department to occupant of the course selected after approval has been obtained.	ess the students based on iversity, the internal supe Capstone requirement. Dessed on "Pass/Fail" basis btain the approval. ection system and should be a section system.	n their performance rvisor will assess the tails of internship will so Students who are the made through the			

STAT4767	Actuaria	al science interi	nship (6 credits)	Academic Ye	ar 2017		
Offering Department	Statistics	& Actuarial Science	e	Quota			
Course Co-ordinator	Dr A G Be	enchimol, Statistics	& Actuarial Science (ug_enquiry@saas	.hku.hk)			
Teachers Involved	(Various t	teachers as the ass	essors of oral presentations and written	reports, Statistics & Actuar	ial Science)		
Course Objectives			tuarial science students who take on a complete this course as a project based of		lar internships. The		
Course Contents & Topics	encounte	red by the student	written report which should emphasize during his/her internship. In many situat volved in during his/her internship.				
Course Learning	On succe	ssful completion of	this course, students should be able to:				
Outcomes	CLO 1	gain practical expe	eriences during internship				
	CLO 2	describe basic act	uarial practices learned during the interr	nship			
	CLO 3	explain how actua	rial theories learned in University can be	applied in practice			
	CLO 4	provide context fo	r specific technical skills developed in ba	sic actuarial courses			
Pre-requisites (and Co-requisites and Impermissible combinations)	programn This caps	ne including STAT3 stone course is only	s of advanced level disciplinary core 1901; and 1 for BSc(Actuarial Science) students; an allowed to take this capstone course is	d is mutually exclusive with	`		
Offer in 2017 - 2018	Y 1st	sem 2nd sem	Offer in 2018 - 2019 : Y	Examination	No Exam		
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass Fail	assigned by supervisithe job. Successfully and evaluation by su of "Distinction".  Very limited or no ab by supervisor(s). Fail	dge to solve problems in the workplace. Successfi sor(s). Establishes effective collaboration and con fulfills the requirements set out in the Course De upervisor(s), etc. Students demonstrating exceller illity to solve problems in the workplace. Fails to his s to establish effective collaboration or communic the requirements set out in the Course Descript sor(s), etc.	nmunication with supervisor(s), c scription regarding working hours nt performance in the above work andle or carry out the work requir ation with supervisor(s), other col	olleagues, and clients in s, written and oral report uld be awarded a grade ed in the job or assigned leagues, or clients in the		
Course Type	Internship	)	· ·				
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Internship	p work	it is expected that students are to or 120 working days	960			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral pres	sentation	oral presentation and in-class discussion	40	CLO 1,2,3,4		
	Written re	eport	written report	60	CLO 1,2,3,4		
Course Website	moodle.h	ku.hk					
Additional Course		Oral presentation oral presentation and in-class discussion 40 CLO 1,2,3,					

STAT4798	Statistic	cs and actuarial	science project (6 credits)	Academic Yea	ar 2017	
Offering Department	Statistics	& Actuarial Science	· · · · · · · ·	Quota	50	
Course Co-ordinator	Prof S M	S Lee, Statistics & A	Actuarial Science (smslee@hku.hk)			
Teachers Involved	(Various	teachers as the asse	essors of oral presentations and writte	n reports,Statistics & Actuari	al Science)	
Course Objectives	experienc	ce in approaching a	itable for Actuarial Science students versite it and in o	ral presentation.		
Course Contents & Topics			supervision of individual staff membe problems of practical and/or academic		of statistics and/o	
Course Learning			this course, students should be able to	):		
Outcomes			ıl research problems			
			anced techniques in probability and/or	•	oblems	
		•	sent research findings in a professiona			
Pre-requisites and Co-requisites and Impermissible combinations)	programn Pass or a This caps This cour	ne including STAT39 dready enrolled in at stone course is only se is mutually exclu	s of advanced level disciplinary cor 902 and STAT3907; and t least one of the following courses: ST for BSc(Actuarial Science) students; a sive with STAT4711. allowed to take this capstone course is	AT3616, STAT3911, STAT4 and subject to the consent of	1602; and	
Offer in 2017 - 2018			Offer in 2018 - 2019 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A	Demonstrate thorough original thought. Insight to quote/reference ap	h grasp of the subject. Show strong analytical htful use and critical analysis / evaluation of info thty. Critical use of data and results to draw ap esentational skills. [Work of A+ should show co	and critical abilities and logical the prmation drawn from a full range of propriate and insightful conclusions	inking, with evidence on high quality sources and s. Apply highly effective	
	В					
	С	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.				
	D					
	Fail	analytical and critical	e of little or no grasp of the knowledge and abilities, logical and coherent thinking. Limited and results and/or unable to draw appropria ineffective.	d use of secondary sources and n	o critical comparison o	
Course Type	Project-ba	ased course				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Reading	/ Self study			120	
Assessment Methods and Weighting	Methods	<b>S</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral pres	sentation	oral presentation & in-class discussion	40	CLO 1,2,3	
	Research	h report	written report	60	CLO 1,2,3	
Course Website	moodle.h	ku.hk				
Additional Course	Approval	is subject to past ac	cademic performance.			

STAT4799	Statistics project (12 credits)	Academic Year	2017			
Offering Department	Statistics & Actuarial Science	Quota	30			
Course Co-ordinator	Prof S M S Lee, Statistics & Actuarial Science (smslee@hku.hk)					
Teachers Involved	(Various teachers as the assessors of oral presentations and written reports,	Statistics & Actuarial	Science)			
Course Objectives	Each year a few projects suitable for students majoring in Decision Analytic offered to provide students with practical experience in approaching a real presentation.					
Course Contents & Topics	These projects, under the supervision of individual staff members, involve probability in a wide range of problems of practical and/or academic interests		statistics and/or			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 gain first-hand experience in solving a research or applied problem in	statistics or related	areas			
	CLO 2 develop skills in important technical tools, including the use of comp statistical research and data analyses	outer software or proc	grams, for typical			
	CLO 3 write succinct reports on the findings of a research study					
	CLO 4 make concise oral presentation of the findings of a research study					
Pre-requisites (and Co-requisites	Pass in at least 24 credits of advanced level disciplinary core/elective of Management/Statistics Majors including STAT3600; and					
and Impermissible combinations)	Pass or already enrolled in at least one of the following courses: STAT361: and	2, STAT3911, STAT4	4601, STAT4602;			
	Not for students who have already enrolled in STAT3799 in this academic ye					
	This capstone course is only for students majoring in Decision Analytics/Ris	k Management/Stati	stics; and subject			
	to the consent of course coordinator.					
	This course is mutually exclusive with STAT4710.	0 -4				
055 - 0047 - 0040	The earliest that a student is allowed to take this capstone course is their year		N. E.			
Offer in 2017 - 2018	Y Year long Offer in 2018 - 2019 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject. Show strong analytical and critical original thought. Insightful use and critical analysis / evaluation of information dra to quote/reference aptly. Critical use of data and results to draw appropriate ar organizational and presentational skills. [Work of A+ should show considerable as the content of the	wn from a full range of hig id insightful conclusions.	h quality sources and Apply highly effective			

		areas relevant to the topic.]			
	В	relevant information from s	rasp of the subject. Evidence of analytica ources, showing ability to make meaningfu ly. Correct use of data of results to draw a	I comparisons between different	secondary interpretations
	С	Use of relevant information quote/reference aptly. Most	ncomplete grasp of the subject. Evidence on from sources, showing ability to make stly correct but some erroneous use of o zational and presentational skills.	e comparisons between differen	nt interpretations and to
	D	logical thinking, but with lir through summary rather th	ited grasp, with retention of some relevant i nited analytical and critical abilities. Demo an analysis and comparison. Limited ability ctive organizational and presentational skills	nstrate use and reference of se to use data and results to draw	veral sources, but mainly
	Fail	analytical and critical abilit	little or no grasp of the knowledge and u ies, logical and coherent thinking. Limited results and/or unable to draw appropriate ctive.	use of secondary sources and	no critical comparison of
Course Type	Project-	based course			
Course Teaching	Activiti	es	Details		No. of Hours
& Learning Activities	Reading	g / Self study	the student is expected to n supervisor regularly in the course		240
Assessment Methods and Weighting	Method	is	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Disserta	ation	written report	60	CLO 1,2,3
	Oral pre	esentation	oral presentation & in-class discussion	40	CLO 1,2,4
Course Website	moodle.	hku.hk			
Additional Course Information	Approva	al is subject to past acade	mic performance.		

STAT4901	Risk the	eory II (6 credit	s)		Academic Yea	r 2017
Offering Department	Statistics	& Actuarial Science	ce .		Quota	
Course Co-ordinator	TBC, Stat	tistics & Actuarial	Science ()			
Teachers Involved						
Course Objectives			ed course in risk theory theory, aggregate claims p			l in STAT3906. li
Course Contents & Topics	coefficien Poisson p	t; Lundbergs ineq	n model; compound Poiss uality; Tijms approximation nodel; IBNR (Incurred But outions.	; non-homoger	eous birth process; conta	gion model; mixed
Course Learning Outcomes	CLO 1 ur	nderstand utility th nd utility maximiza	f this course, students shou eory including some comm tion continuous ruin models		y functions, Jensens inequ	ıality, risk aversior
			ment coefficient, Lundbergs	s inequality and	Tiims approximation in rui	n theory
			ct of reinsurance and change			
			nogeneous birth process a	•		r claim frequencie
			oisson process and its app		•	
			nip between stop-loss mom		<u> </u>	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	TAT3906				
Offer in 2017 - 2018	N Off	fer in 2018 - 2019	: Y		Examination	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or of analytical and co	no evidence of command of knoritical abilities, logical and coherition and presentational skills are n	wledge and skills reent thinking. Show	equired for attaining the course le very little or no ability to app	
Course Type	Lecture-b	ased course				
Course Teaching	Activities	S	Details	Details		No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Reading	/ Self study				100
Assessment Methods and Weighting	Methods	•	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	Coursework (as tutorials, and a class	signments, ss test)	25	CLO 1,2,3,4,5,6
	Examinat		One 3-hour written		75	CLO 1,2,3,4,5,6
Required/recommended reading and online materials	edition).		& Willmot G.E.: Loss Modaene J., & Denuit M.: Mode		,	, ,

	Bowers N.L., Gerber H.U., Hickman J.C. & Jones D.A.: Actuarial Mathematics (Society of Actuaries, 1997, 2nd edition).
	Willmot G.E. & Lin X.S.: Lundberg Approximations for Compound Distributions with Insurance Applications (Springer, 2000, 1st edition).
Course Website	moodle.hku.hk

STAT4902	Selecte	d topics in actuarial	science (6 credits)	Academic Ye	ar 2017	
Offering Department	Statistics	& Actuarial Science		Quota		
Course Co-ordinator	TBC, Stat	istics & Actuarial Science	e ()			
Teachers Involved						
Course Objectives		will find useful. It focus	e in actuarial science which discuses on tools that are in the from			
Course Contents & Topics	Coherent Ordering Comonote	of risks; Renewal equation	n calculation principles; Copulas; lons with insurance applications; Reendency; Phase-type distributions;	eliability properties; Genera	alized linear models	
Course Learning		•	ourse, students should be able to:			
Outcomes	CLO 1	understand the mathem	atical tools useful for further resear	rch and applications		
	CLO 2		potentially unseen problems			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	TAT3906				
Offer in 2017 - 2018	N Off	er in 2018 - 2019 : N		Examination		
Grade Descriptors (A+ to F)	A					
	В					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	of analytical and critical ab	ence of command of knowledge and skills illities, logical and coherent thinking. Sho presentational skills are minimally effective	w very little or no ability to ap		
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Coursework (assignments, tutorials and class test(s))	40	CLO 1,2	
	Examina	tion		60	CLO 1,2	
Required/recommended reading and online materials	- Denuit N - Willmot (Springer - McNeil	M., Dhaene J., Goovaerts G.E. & Lin X.S.: Lund , 2000, 1st edition).	J., & Denuit M.: Modern Actuarial F M., & Kaas R.: Actuarial Theory for berg Approximations for Compou echts, P.: Quantitative Risk Mana 1st edition).	or Dependent Risks (Wiley and Distributions with Inst	, 2005, 1st edition). urance Applications	
Course Website	moodle.h	<b>2</b>	,			

STAT4903	Actuarial techniques for general insurance (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr A G Benchimol, Statistics & Actuarial Science (ug_enquiry@saas.hku.h	nk)	
Teachers Involved	(Dr A G Benchimol, Statistics and Actuarial Science)		
Course Objectives	The purpose of this course is to develop knowledge of the basic techniq liabilities for general insurance. Application of the actuarial techniques to be emphasized. The course also provides general knowledge on the general china. Students will acquire the fundamental concept on general insural supporting calculations.	resolve general insurar eral insurance markets in	nce problems wil n Hong Kong and
Course Contents & Topics	1. General Insurance Markets in Hong Kong, Taiwan and PRC - Introduction of general insurance markets - Regulations on general insurance  2. Basic techniques for ratemaking - How to read and use manual rate pages - Ratemaking related to exposures - Ratemaking related to premiums - Ratemaking related to loss and loss adjustment expenses - Calculate the underwriting expense provisions - Pure premium methods		

		differential and relativities erations when selecting t				
		ating claim liabilities				
	- Reservi	nd analyze claim develor ng techniques erations when estimating	· ·			
	- Estimate	•	claim adjustment expenses			
			using predictive modeling in Gene rise Risk Management, etc	ral Insurance		
Course Learning Outcomes	On succes		course, students should be able to: and underlying risk of general insu			
	CLO 2		rate for basic general insurance pro			
	CLO 3	estimate the claims liab	pilities for general insurance produc	cts		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	TAT3906				
Offer in 2017 - 2018	Y 2nd	d sem Offer in 2018 - 2	2019 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	stery at an advanced level of extensive kr trong analytical and critical abilities and log ide range of complex, familiar and unfam	ical thinking, with evidence of or	ginal thought, and ability	
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	of analytical and critical at	pence of command of knowledge and skills bilities, logical and coherent thinking. Sho presentational skills are minimally effective	ow very little or no ability to ap		
Course Type		ased course				
Course Teaching	Activities	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3	
	Examinat		One 3-hour written examination	75	CLO 2,3	
reading and	2010		d Claims Using Basic Techniques,			
online materials			Ratemaking, Casualty Actuarial So	ciety, Fourth Edition, Octo	ber 2010	
Course Website	moodle.hl					
Additional Course Information	American June 1980 Casualty I Casualty I Feldblum,	Standard Board of the Ases in Property/Casualty I Academy of Actuaries O Actuarial Society Comm Insurance Ratemaking, (	Committee on Risk Classification iittee on Ratemaking Principles, St Casualty Actuarial Society, May 19 te Premiums: An Asset Share Prici	n, Risk Classification State catement of Principles Reg 88	ement of Principles, arding Property and	

STAT7609	Research methods in statistics (6 credits)	Academic Year	2017
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr J F Xu, Statistics & Actuarial Science (xujf@hku.hk)		
Teachers Involved	(Dr J F Xu, Statistics & Actuarial Science)		
Course Objectives	This course introduces some statistical concepts and methods which potential preparing for work on a research degree in statistics. Focus is on applic techniques and their underlying theory.		
Course Contents & Topics	Contents may be selected from: (1) Basic asymptotic methods: modes of convergence; stochastic orders; latheorems; delta method; Edgeworth expansions; saddlepoint approximations. (2) Parametric and nonparametric likelihood methods: high-order approximation signed likelihood ratio statistics; empirical likelihood. (3) Nonparametric statistical inference: sign and rank tests; Kolmogorov-Smir density estimation; kernel methods. (4) Computationally-intensive methods: cross-validation; bootstrap; permutation (5) Robust methods: measures of robustness; M-estimator; L-estimator; R-estir (6) Sequential analysis: sequential probability ratio test; sequential estimation. (7) Model selection using information criteria. (8) Other topics as determined by the instructor.	ns; profile likelihood nov test; nonparan methods.	d and its variants

	On succe	essful completion of this of	course, students should be able to:			
Outcomes	CLO 1	comprehend the langua	ge and technicalities found in statisti	cal research literature		
	CLO 2	understand the use of st	tandard mathematical tools for condu	ucting statistical research		
	CLO 3	apply a variety of resear	ch tools to solve standard statistical	problems		
	CLO 4	acquire exposure to son	ne developments in contemporary st	atistical research		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	TAT3600 or STAT3907				
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	019 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	В	learning outcomes. Show s to apply knowledge to a w presentational skills.	stery at an advanced level of extensive kno trong analytical and critical abilities and logic ride range of complex, familiar and unfamilian mmand of a broad range of knowledge and	al thinking, with evidence of orig ar situations. Apply highly effec	ginal thought, and ability ctive organizational and	
		learning outcomes. Show e	vidence of analytical and critical abilities and I ons. Apply effective organizational and preser	logical thinking, and ability to app		
	С					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Danis and the Cities and and				
	ган	of analytical and critical a	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show presentational skills are minimally effective of	very little or no ability to app		
Course Type		of analytical and critical a	bilities, logical and coherent thinking. Show	very little or no ability to app		
		of analytical and critical a problems. Organization and assed course	bilities, logical and coherent thinking. Show	very little or no ability to app		
Course Teaching	Lecture-b	of analytical and critical al problems. Organization and ased course	bilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	oly knowledge to solve	
Course Teaching	Lecture-b Activities	of analytical and critical al problems. Organization and ased course	bilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	No. of Hours	
Course Type Course Teaching & Learning Activities	Lecture-b Activities Lectures Tutorials	of analytical and critical al problems. Organization and ased course	bilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	No. of Hours	
Course Teaching	Lecture-b Activities Lectures Tutorials	of analytical and critical a problems. Organization and lased course s	bilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	No. of Hours 36 12	
Course Teaching & Learning Activities  Assessment Methods	Lecture-b Activities Lectures Tutorials Reading	of analytical and critical all problems. Organization and assed course s	bilities, logical and coherent thinking. Show presentational skills are minimally effective of Details	very little or no ability to apport ineffective.  Weighting in final	No. of Hours 36 12 100 Assessment Methods	
Course Teaching & Learning Activities  Assessment Methods	Lecture-b Activities Lectures Tutorials Reading Methods	of analytical and critical al problems. Organization and cased course s / Self study	Details  Details  Coursework (assignments,	Weighting in final course grade (%)	No. of Hours  36  12  100  Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities  Assessment Methods	Lecture-b Activities Lectures Tutorials Reading Methods  Assignme Examinat DasGupta Efron, B. Owen, A.I Shao, J. (	of analytical and critical al problems. Organization and rased course s  / Self study  ents tion a, A. (2008). Asymptotic and Tibshirani, R.J. (1998). (2001). Empirical Like (1999). Mathematical Sta	Details  Details  Coursework (assignments, tutorials, and a class test)	Weighting in final course grade (%)  25  75  Springer:. Chapman & Hall: New Yo	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4	

STAT7610	Advanc	ed probability (6 cr	redits)	Academic Year	2017
Offering Department	Statistics	& Actuarial Science		Quota	
Course Co-ordinator	Dr J Son	g, Mathematics (jianson	g@maths.hku.hk)		
Teachers Involved		ng,Mathematics)			
Course Objectives		in theoretical probabilit		probability. The course will foculents to do research in actuarial s	
Course Contents & Topics	space, n	neasurable functions, i		re and probability, measure spac theory, characteristic functions, tingales.	
Course Learning	On succe	essful completion of this	course, students should be ab	ole to:	
Outcomes			ntal measure theory and proba		
		earn the general concep and dominated converge		ne monotone convergence theore	m, Fatou's lemma
			of conditional expectation		
	CLO 4 h	ave some elementary k	nowledge of martingale		
(and Co-requisites and Impermissible	Pass in S	STAT3603 or STAT3903	•		
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018		t sem Offer in 2018 - 2  Demonstrate thorough materining outcomes. Show to apply knowledge to a	2019 : Y astery at an advanced level of exten strong analytical and critical abilities a	Examination sive knowledge and skills required for a and logical thinking, with evidence of origi unfamiliar situations. Apply highly effecti	nal thought, and ability
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)	Y 1s	t sem Offer in 2018 - 2  Demonstrate thorough malearning outcomes. Show to apply knowledge to a presentational skills.  Demonstrate substantial of	2019: Y astery at an advanced level of exten strong analytical and critical abilities a wide range of complex, familiar and	sive knowledge and skills required for a and logical thinking, with evidence of origin unfamiliar situations. Apply highly effect dge and skills required for attaining at lea	taining all the course nal thought, and ability ve organizational and ast most of the course
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1s	t sem Offer in 2018 - 2  Demonstrate thorough ma learning outcomes. Show to apply knowledge to a presentational skills.  Demonstrate substantial of learning outcomes. Show and some unfamiliar situations are substantial or some unfamiliar situations.	2019 : Y astery at an advanced level of exten strong analytical and critical abilities a wide range of complex, familiar and command of a broad range of knowle evidence of analytical and critical abilit ions. Apply effective organizational an	sive knowledge and skills required for a and logical thinking, with evidence of origin unfamiliar situations. Apply highly effect dge and skills required for attaining at lea lies and logical thinking, and ability to apply d presentational skills.	ttaining all the course nal thought, and ability ve organizational and ast most of the course y knowledge to familiar
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1s	t sem Offer in 2018 - 2  Demonstrate thorough me learning outcomes. Show to apply knowledge to a presentational skills.  Demonstrate substantial of learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence shows a six outcomes. Show evidence shows a six outcomes.	2019: Y astery at an advanced level of extenstrong analytical and critical abilities awide range of complex, familiar and command of a broad range of knowle evidence of analytical and critical abilitions. Apply effective organizational an incomplete command of knowledge of some analytical and critical abilities.	sive knowledge and skills required for a and logical thinking, with evidence of origin unfamiliar situations. Apply highly effect dge and skills required for attaining at leaties and logical thinking, and ability to appl d presentational skills. and skills required for attaining most of les and logical thinking, and ability to appl	taining all the course nal thought, and ability we organizational and ast most of the course y knowledge to familial f the course learning
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1s	bemonstrate thorough malearning outcomes. Show to apply knowledge to a presentational skills.  Demonstrate substantial of learning outcomes. Show and some unfamiliar situational bemonstrate general but outcomes. Show evidence familiar situations. Apply momentate pertial but lir Show evidence of some or	2019 : Y astery at an advanced level of exten strong analytical and critical abilities a wide range of complex, familiar and command of a broad range of knowle evidence of analytical and critical abilit itions. Apply effective organizational an incomplete command of knowledge e of some analytical and critical abilit noderately effective organizational and mitted command of knowledge and ski	sive knowledge and skills required for a and logical thinking, with evidence of original unfamiliar situations. Apply highly effecting and skills required for attaining at least ies and logical thinking, and ability to apply do presentational skills. and skills required for attaining most of ies and logical thinking, and ability to apply presentational skills. Ills required for attaining some of the cour mited analytical and critical abilities. Show	ttaining all the course nal thought, and ability we organizational and ast most of the course y knowledge to familial of the course learning ly knowledge to most se learning outcomes
and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1s A B C	bemonstrate thorough malearning outcomes. Show to apply knowledge to a presentational skills.  Demonstrate substantial of learning outcomes. Show and some unfamiliar situation Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lir Show evidence of some or knowledge to solve proble Demonstrate little or no evidenalytical and critical	2019: Y astery at an advanced level of extenstrong analytical and critical abilities a wide range of complex, familiar and command of a broad range of knowle evidence of analytical and critical abilitions. Apply effective organizational an incomplete command of knowledge of some analytical and critical abilition of some of the command of knowledge and skiderent and logical thinking, but with lims. Apply limited or barely effective or idence of command of knowledge and skiderent and logical thinking.	sive knowledge and skills required for a and logical thinking, with evidence of original unfamiliar situations. Apply highly effecting and skills required for attaining at least ites and logical thinking, and ability to apply do presentational skills. and skills required for attaining most of ites and logical thinking, and ability to appresentational skills. Ills required for attaining some of the cour imited analytical and critical abilities. Show ganizational and presentational skills. d skills required for attaining the course least show yery little or no ability to apply show very little or no ability to apply	ttaining all the course nal thought, and ability we organizational and ast most of the course y knowledge to familial f the course learning ly knowledge to most se learning outcomes. I limited ability to apply arning outcomes. Lack
and Co-requisites and Impermissible combinations)  Offer in 2017 - 2018  Grade Descriptors (A+ to F)	Y 1s A B C D	bemonstrate thorough malearning outcomes. Show to apply knowledge to a presentational skills.  Demonstrate substantial of learning outcomes. Show and some unfamiliar situation Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lir Show evidence of some or knowledge to solve proble Demonstrate little or no evidenalytical and critical	2019: Y astery at an advanced level of extenstrong analytical and critical abilities awide range of complex, familiar and command of a broad range of knowle evidence of analytical and critical abilitions. Apply effective organizational an incomplete command of knowledge of some analytical and critical abilitinoderately effective organizational and mited command of knowledge and skill observent and logical thinking, but with I ms. Apply limited or barely effective or didence of command of knowledge an abilities, logical and coherent thinkin	sive knowledge and skills required for a and logical thinking, with evidence of original unfamiliar situations. Apply highly effecting and skills required for attaining at least ites and logical thinking, and ability to apply do presentational skills. and skills required for attaining most of ites and logical thinking, and ability to appresentational skills. Ills required for attaining some of the cour imited analytical and critical abilities. Show ganizational and presentational skills. d skills required for attaining the course least show yery little or no ability to apply show very little or no ability to apply	ttaining all the course nal thought, and ability we organizational and ast most of the course y knowledge to familial f the course learning ly knowledge to most se learning outcomes. I limited ability to apply arning outcomes. Lack
cand Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors (A+ to F)  Course Type Course Teaching	Y 1s A B C D	t sem Offer in 2018 - 2  Demonstrate thorough me learning outcomes. Show to apply knowledge to a presentational skills.  Demonstrate substantial or learning outcomes. Show and some unfamiliar situations apply me outcomes. Show evidence familiar situations. Apply me Demonstrate partial but lim Show evidence of some or knowledge to solve proble Demonstrate little or no eviden analytical and critical problems. Organization and passed course	2019: Y astery at an advanced level of extenstrong analytical and critical abilities awide range of complex, familiar and command of a broad range of knowle evidence of analytical and critical abilitions. Apply effective organizational an incomplete command of knowledge of some analytical and critical abilitinoderately effective organizational and mited command of knowledge and skill observent and logical thinking, but with I ms. Apply limited or barely effective or didence of command of knowledge an abilities, logical and coherent thinkin	sive knowledge and skills required for a and logical thinking, with evidence of original unfamiliar situations. Apply highly effecting and skills required for attaining at least ites and logical thinking, and ability to apply do presentational skills. and skills required for attaining most of ites and logical thinking, and ability to appresentational skills. Ills required for attaining some of the cour imited analytical and critical abilities. Show ganizational and presentational skills. d skills required for attaining the course least show yery little or no ability to apply show very little or no ability to apply	ttaining all the course nal thought, and ability we organizational and ast most of the course y knowledge to familial f the course learning ly knowledge to most se learning outcomes. I limited ability to apply arning outcomes. Lack
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Y 1s A B C D Fail	t sem Offer in 2018 - 2  Demonstrate thorough me learning outcomes. Show to apply knowledge to a presentational skills.  Demonstrate substantial or learning outcomes. Show and some unfamiliar situations and some unfamiliar situations. Apply memonstrate general but outcomes. Show evidence familiar situations. Apply memonstrate partial but life Show evidence of some or knowledge to solve proble Demonstrate little or no eviden analytical and critical problems. Organization and assed course	2019: Y astery at an advanced level of extenstrong analytical and critical abilities awide range of complex, familiar and command of a broad range of knowle evidence of analytical and critical abilitions. Apply effective organizational an incomplete command of knowledge of some analytical and critical abilitinoderately effective organizational and mited command of knowledge and skilonerent and logical thinking, but with I ims. Apply limited or barely effective or iddence of command of knowledge an abilities, logical and coherent thinkin id presentational skills are minimally e	sive knowledge and skills required for a and logical thinking, with evidence of original unfamiliar situations. Apply highly effecting and skills required for attaining at least ites and logical thinking, and ability to apply do presentational skills. and skills required for attaining most of ites and logical thinking, and ability to appresentational skills. Ills required for attaining some of the cour imited analytical and critical abilities. Show ganizational and presentational skills. d skills required for attaining the course least show yery little or no ability to apply show very little or no ability to apply	ttaining all the course nal thought, and ability ve organizational and ast most of the course y knowledge to familial of the course learning by knowledge to most se learning outcomes. I limited ability to apply arming outcomes. Lack y knowledge to solve

	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4	
	Examination	One 2-hour written examination	75	CLO 1,2,3,4	
Required/recommended reading and online materials	Jean Jacod and Philip Protter: Probability Essentials (Universitext, Springer-Verlag, New York, 2004, 2nd edition) Chung K. L.: A Course in Probability Theory (Academic Press, 2001, 3rd edition)				
Course Website	moodle.hku.hk				

STAT7611	Computational statistics (6 credits)  Academic You				ar 2017
Offering Department	Statistics & Actuarial Science Quota				
Course Co-ordinator	Prof G Yin, Statistics & Actuarial Science (gyin@hku.hk)				
Teachers Involved	(Prof G Yin, Statistics & Actuarial Science)				
Course Objectives	This course aims to give undergraduate and postgraduate students in statistics a background in modern computationally intensive methods in statistics. It emphasizes the role of computation as a fundamental tool of discovery in data analysis, of statistical inference, and for development of statistical theory and methods.				
Course Contents & Topics	Contents include: Bayesian statistics, Markov chain Monte Carlo methods including Gibbs sampler, the Metropolis Hastings algorithm, and data augmentation; Generation of random variables including the inversion methods, rejection sampling, the sampling/importance resampling method; Optimization techniques including Newton's method, expectation-maximization (EM) algorithm and its variants, and minorization-maximization (MM) algorithms Integration including Laplace approximations, Gaussian quadrature, the importance sampling method; and other topics such as Hidden Markov models, neural networks, and Bootstrap methods.				
Course Learning			course, students should be able to:		
Outcomes	CLO 1 un		e of the technique for generating rai	ndom variables in Bayesi	an statistics, Monte
	alg	orithm and apply them	and disadvantages of the Newton-F to fit generalized linear models		
			and basic principle of the EM-type and apply them to solve practical pro		algorithms, realize
		ply EM-type algorithms nerate posterior sample	s to find the posterior mode and apes	pply Markov chain Monte	Carlo methods to
		' '	to obtain estimated standard error netric and non-parametric cases	s of estimators and conf	idence intervals of
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in ST	AT3600 or STAT3907			
Offer in 2017 - 2018	Y 1st	sem Offer in 2018 - 20	019 : Y	Examination	Dec
Grade Descriptors (A+ to F)	В	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course			
	С	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills red of attaining most of the course learning the state of the course learning and state of the course learning that the state of the course learning the state of the course learning that the stat			
		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.			
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge problems. Organization and presentational skills are minimally effective or ineffective.				
			presentational skills are minimally effective of	i iliciicotive.	oly knowledge to solve
	_	ised course	presentational skills are minimally effective o	THICHOUTC.	· ·
Course Teaching	Activities	ised course	Details	i ilionodive.	No. of Hours
Course Teaching	Activities Lectures	ised course	İ	The first term of the first te	No. of Hours
Course Teaching	Activities Lectures Tutorials	sed course	İ	THE TOTAL CONTROL OF THE TOTAL	No. of Hours 36 12
Course Teaching	Activities Lectures Tutorials	ised course	İ	THE TOTAL OF THE T	No. of Hours
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Tutorials	sed course	İ	Weighting in final course grade (%)	No. of Hours 36 12
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Tutorials Reading / Methods  Assignme	Self study	Details  Details  Coursework (assignments, practical work, and a term test)	Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Lectures Tutorials Reading / Methods	Self study	Details  Details  Coursework (assignments,	Weighting in final course grade (%)	No. of Hours  36 12 100 Assessment Methods to CLO Mapping
Course Teaching & Learning Activities  Assessment Methods	Activities Lectures Tutorials Reading / Methods  Assignme Examinati Tan, M., T Computation	Self study  nts on Tian, G.L. and Ng, K.W. on (Chapman & Hall/CF	Details  Details  Coursework (assignments, practical work, and a term test) One 2-hour written examination Bayesian Missing Data Problems	Weighting in final course grade (%)  25  75 : EM, Data Augmentatio	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5

STAT7614	Advanced statistical modelling (6 credits)  Academ		2017	
Offering Department	Statistics & Actuarial Science	Quota		
Course Co-ordinator	Dr Y K Chung, Statistics & Actuarial Science (yukchung@hku.hk)			
Teachers Involved	(Dr Y K Chung, Statistics & Actuarial Science)			
Course Objectives	This course introduces modern methods for constructing and evaluating statistic using popular computing software. It will cover both the underlying principles o model estimation procedures.			

Course Contents & Topics	Topics from: (i) Generalized linear models; (ii) Mixed models; (iii) Kernel and local polynomial regression; selection of smoothing parameters; (iv) Generalized additive models; (v) Hidden Markov model and Bayesian network.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes			and basic characteristics of each st	atistical model		
	CLO 2 identify for a given set of data the most suitable statistical model and tools to use					
	CLO 3 develop skills of building a scoring model for various management and prediction, problems involving a binary response; employing the powerful tool of kernel density estimation using SAS or R for real data mining problems; and analysing data with SAS procedures PROC LOGISTIC, PROC GENMOD, PROC GLM, PROC UNIVARIATE (option KERNEL) or equivalent R Packages					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3600 or STAT3907					
Offer in 2017 - 2018	Y 2nd	d sem Offer in 2018 - 2	019 : Y	Examination	n May	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. La of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials			12		
	Reading / Self study				100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework (assignments and class test(s))	50	CLO 1,2,3	
	Examination One 2-hour written examination 50 CLO 1,2,3				CLO 1,2,3	
Required/recommended reading and online materials	Recommend Reading: R.H. Myers et al., 2010: Generalized Linear Models (2nd ed.), Wiley     Textbook: W. Hardle et al., 2004: Nonparametric and Semi-parametric Models. Springer					
Course Website	3. Suggested Reading: M. Panik, 2009: Regression Modeling, CRC Press					
Course Website	moodie.H	NU.IIN				

	Advance credits)	ed quantitative risk management and finance (6	Academic Year	2017		
Offering Department	Statistics 8	& Actuarial Science	Quota			
Course Co-ordinator	Prof W K Li, Statistics & Actuarial Science (hrntlwk@hku.hk)					
Teachers Involved	(Dr J Song,Mathematics) (Prof W K Li,Statistics & Actuarial Science)					
Course Objectives	This course covers statistical methods and models of importance to risk management and finance and links finance theory to market practice via statistical modeling and decision making. Emphases will be put on empirical analyses to address the discrepancy between finance theory and market data.					
Course Contents & Topics	Contents include: Elementary Stochastic Calculus; Basic Monte Carlo and Quasi-Monte Carlo Methods; Variance Reduction Techniques; Simulating the value of options and the value-at-risk for risk management; Review of univariate volatility models; multivariate volatility models; Value-at-risk and expected shortfall; estimation, back-testing and stress testing; Extreme value theory for risk management.					
Course Learning	On succes	sful completion of this course, students should be able to:				
Outcomes	CLO 1 apply Monte Carlo methods to determine the value of options and other derivative securities					
	CLO 2 predict volatility of a set of securities using appropriate models					
	CLO 3 estimate the value-at-risk under extreme value theory					
		<b>,</b>				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in ST	<b>,</b>				
(and Co-requisites and Impermissible	Pass in ST	<b>,</b>	Examination	May		
(and Co-requisites and Impermissible combinations)	Pass in ST	AT4608	edge and skills required for at hinking, with evidence of origin	taining all the course nal thought, and ability		
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in ST	AT4608  sem Offer in 2018 - 2019 : Y  Demonstrate thorough mastery at an advanced level of extensive knowle learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar seconds.	edge and skills required for at hinking, with evidence of origin situations. Apply highly effective lls required for attaining at lead cal thinking, and ability to apply	taining all the course hal thought, and ability we organizational and list most of the course		
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in ST	Sem Offer in 2018 - 2019 : Y  Demonstrate thorough mastery at an advanced level of extensive knowle learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar spresentational skills.  Demonstrate substantial command of a broad range of knowledge and ski learning outcomes. Show evidence of analytical and critical abilities and logical to the command of a broad range of knowledge and ski learning outcomes. Show evidence of analytical and critical abilities and logical to the command of a broad range of knowledge and ski learning outcomes. Show evidence of analytical and critical abilities and logical to the command of a broad range of knowledge and ski learning outcomes.	edge and skills required for at hinking, with evidence of origir situations. Apply highly effectivalls ills required for attaining at lea cal thinking, and ability to apply onal skills. required for attaining most of cal thinking, and ability to app	taining all the course nal thought, and ability we organizational and list most of the course knowledge to familiar of the course learning		
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in ST  Y 2nd  A  B	Sem Offer in 2018 - 2019 : Y  Demonstrate thorough mastery at an advanced level of extensive knowle learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar spresentational skills.  Demonstrate substantial command of a broad range of knowledge and skillearning outcomes. Show evidence of analytical and critical abilities and logicand some unfamiliar situations. Apply effective organizational and presentation because the properties of the pr	edge and skills required for at hinking, with evidence of origir situations. Apply highly effective ills required for attaining at lea cal thinking, and ability to apply onal skills. required for attaining most or cal thinking, and ability to app nal skills. for attaining some of the coun- tical and critical abilities. Show	taining all the course nal thought, and ability we organizational and list most of the course knowledge to familiar of the course learning ly knowledge to most se learning outcomes.		
(and Co-requisites and Impermissible combinations) Offer in 2017 - 2018 Grade Descriptors	Pass in ST  Y 2nd  A  B  C	Sem Offer in 2018 - 2019 : Y  Demonstrate thorough mastery at an advanced level of extensive knowle learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar spresentational skills.  Demonstrate substantial command of a broad range of knowledge and skillearning outcomes. Show evidence of analytical and critical abilities and logicand some unfamiliar situations. Apply effective organizational and presentation because the structure of the st	edge and skills required for at hinking, with evidence of origin situations. Apply highly effective ills required for attaining at lea cal thinking, and ability to apply onal skills. required for attaining most of cal thinking, and ability to app mal skills. for attaining some of the coun- tical and critical abilities. Show I and presentational skills. iried for attaining the course lea any little or no ability to apply	taining all the course nal thought, and ability we organizational and st most of the course v knowledge to familiar if the course learning the knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack		

Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3
	Examination	One 2-hour written examination	75	CLO 1,2,3
Required/recommended reading and online materials	McLeish, Don L.: Monte Carlo Simulation & Finance. (Wiley, 2005). Glasserman, Paul: Monte Carlo Methods in Financial Engineering. (Springer, 2003). Danielsson Jon: Financial Risk Forecasting (Willy 2011) McNeil, A. J., Frey, R. & Embrechts, P.: Quantitative Risk Management (Princeton, 2005) Tsay, R.S.: Analysis of Financial Time Series (Wiley, 2010, 3rd edition)			
Course Website	moodle.hku.hk	, , , , , , , , , , , , , , , , , , , ,	,	

**Degree Regulations** 

# SCIENCE

# REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE (BSc)

These regulations apply to students admitted under the 4-year '2012 curriculum' to the BSc degree curriculum to the first year in the academic year 2017-18 and thereafter.

(See also General Regulations and Regulations for First Degree Curricula)

### **Definitions**

Sc1<sup>1</sup> For the purpose of these regulations and the syllabuses for the BSc degree, unless the context otherwise requires:

"Science course" means any course offered by the Faculty of Science, and the School of Biomedical Sciences.

"Advanced Science course" means any level 3, 4 or above course offered by the Faculty of Science and the School of Biomedical Sciences.

"Course" means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

"Syllabus" means courses taught by departments, centres, and schools, offered under a degree curriculum.

"Credits" or "credit-units" means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

# Admission to the BSc degree

- Sc2 To be eligible for admission to the BSc degree, candidates shall:
- (a) comply with the General Regulations;
- (b) comply with the Regulations for First Degree Curricula; and
- (c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.

# Period of study

**Sc3** The curriculum for the BSc degree shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years.

<sup>&</sup>lt;sup>1</sup> This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.

### **Selection of courses**

**Sc4** Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each semester. Any change to the selection of courses shall be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate. Requests for changes after the designated add/drop period of the semester shall not be considered.

# Curriculum requirements and progression in curriculum

### Sc5

- (a) Candidates shall satisfy the requirements prescribed in UG5 of the Regulations of First Degree Curricula.
- (b) Candidates shall take not fewer than 240 credits, in the manner specified in these regulations and the syllabuses.
- (c) Candidates shall take at least 96 credits of Science courses including all required courses of the major programme of the BSc degree curriculum.
- (d) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements may be fewer than 24 credits.
- (e) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load of 288 credits for the normative period of study specified in the curriculum regulations, save as provided for under Sc5(f).
- (f) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load of 432 credits for the maximum period of registration specified in the curriculum regulations.
- (g) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits will be recorded on the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (h) Candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in Sc3, unless otherwise permitted by the Board of the Faculty.

# **Advanced standing**

**Sc6** Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum in accordance with UG2 of the Regulations for First Degree Curricula. Credits granted for advanced standing will be recorded on the transcript of the candidate but shall not be included in the calculation of the GPA.

#### Assessment

## Sc7

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (d) Candidates are required to make up for failed courses in the following manner: repeating the failed course by undergoing instruction and satisfying the assessment, or for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (e) There shall be no appeal against the results of examinations and all other forms of assessment.

# Award of BSc Degree

- **Sc8** To be eligible for the award of the BSc degree, candidates shall have:
- (a) satisfied the requirements in UG5 of the Regulations for First Degree Curricula;
- (b) passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the major programme of the BSc degree curriculum.

# **Honours classification**

# Sc9

(a) Honours classifications shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the Degree of BSc in accordance with the following Graduation GPA scores, with all courses taken (including failed courses, but not including courses approved by the Senate graded as 'Pass', 'Fail' or 'Distinction') carrying weightings which are proportionate to their credit values<sup>2</sup>:

<u>Class of honours</u>	GGPA range
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Graduation GPA and the Board of Examiners for the Degree of BSc may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Graduation GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core course with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

# REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE (BSc)

These regulations apply to students admitted under the 4-year '2012 curriculum' to the BSc degree curriculum to the first year in the academic years 2014-15, 2015-16 and 2016-17, and students admitted directly to the third year in the academic years 2016-17, 2017-18 and 2018-19.

(See also General Regulations and Regulations for First Degree Curricula)

### **Definitions**

Sc1<sup>1</sup> For the purpose of these regulations and the syllabuses for the BSc degree, unless the context otherwise requires:

"Science course" means any course offered by the Faculty of Science, and the School of Biomedical Sciences.

"Advanced Science course" means any level 3, 4 or above course offered by the Faculty of Science and the School of Biomedical Sciences.

"Course" means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

"Syllabus" means courses taught by departments, centres, and schools, offered under a degree curriculum.

"Credits" or "credit-units" means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

# Admission to the BSc degree

- Sc2 To be eligible for admission to the BSc degree, candidates shall:
- (a) comply with the General Regulations;
- (b) comply with the Regulations for First Degree Curricula; and
- (c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.

# **Period of study**

**Sc3** The curriculum for the BSc degree shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years.

<sup>&</sup>lt;sup>1</sup> This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.

### **Selection of courses**

**Sc4** Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each semester. Any change to the selection of courses shall be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate. Requests for changes after the designated add/drop period of the semester shall not be considered.

# Curriculum requirements and progression in curriculum

# Sc5

- (a) Candidates shall satisfy the requirements prescribed in UG5 of the Regulations of First Degree Curricula.
- (b) Candidates shall take not fewer than 240 credits, in the manner specified in these regulations and the syllabuses.
- (c) Candidates shall take at least 96 credits of Science courses including all required courses of the major programme of the BSc degree curriculum.
- (d) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements may be fewer than 24 credits.
- (e) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load of 288 credits for the normative period of study specified in the curriculum regulations, save as provided for under Sc5(f).
- (f) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load of 432 credits for the maximum period of registration specified in the curriculum regulations.
- (g) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits will be recorded on the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (h) Candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in Sc3, unless otherwise permitted by the Board of the Faculty.

## **Advanced standing**

**Sc6** Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum in accordance with UG2 of the Regulations for First Degree Curricula. Credits granted for advanced standing will be recorded on the transcript of the candidate but shall not be included in the calculation of the GPA.

#### Assessment

#### Sc7

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (d) Candidates are required to make up for failed courses in the following manner: repeating the failed course by undergoing instruction and satisfying the assessment, or for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (e) There shall be no appeal against the results of examinations and all other forms of assessment.

## Award of BSc Degree

- **Sc8** To be eligible for the award of the BSc degree, candidates shall have:
- (a) satisfied the requirements in UG5 of the Regulations for First Degree Curricula;
- (b) passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the major programme of the BSc degree curriculum.

#### **Honours classification**

## Sc9

(a) Honours classifications shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the Degree of BSc in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses, but not including courses approved by the Senate graded as 'Pass', 'Fail' or 'Distinction') carrying equal weighting:

Class of honours	<u>CGPA range</u>
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Cumulative GPA and the Board of Examiners for the Degree of BSc may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

## REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE (BSc)

These regulations apply to students admitted under the 4-year '2012 curriculum' to the BSc degree curriculum to the first year in the academic years 2012-13 and 2013-14, and students admitted directly to the third year in the academic years 2014-15 and 2015-16.

(See also General Regulations and Regulations for First Degree Curricula)

#### **Definitions**

Sc1<sup>1</sup> For the purpose of these regulations and the syllabuses for the BSc degree, unless the context otherwise requires:

"Science course" means any course offered by the Faculty of Science, and the School of Biomedical Sciences.

"Advanced Science course" means any level 3, 4 or above course offered by the Faculty of Science and the School of Biomedical Sciences.

"Course" means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

"Syllabus" means courses taught by departments, centres, and schools, offered under a degree curriculum.

"Credits" or "credit-units" means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

## Admission to the BSc degree

- Sc2 To be eligible for admission to the BSc degree, candidates shall:
- (a) comply with the General Regulations;
- (b) comply with the Regulations for First Degree Curricula; and
- (c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.

## **Period of study**

**Sc3** The curriculum for the BSc degree shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years.

<sup>&</sup>lt;sup>1</sup> This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.

#### **Selection of courses**

**Sc4** Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each semester. Any change to the selection of courses shall be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate. Requests for changes after the designated add/drop period of the semester shall not be considered.

## Curriculum requirements and progression in curriculum

## Sc5

- (a) Candidates shall satisfy the requirements prescribed in UG5 of the Regulations of First Degree Curricula.
- (b) Candidates shall take not fewer than 240 credits, in the manner specified in these regulations and the syllabuses.
- (c) Candidates shall take at least 96 credits of Science courses including all required courses of the major programme of the BSc degree curriculum.
- (d) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements may be fewer than 24 credits.
- (e) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load of 288 credits for the normative period of study specified in the curriculum regulations, save as provided for under Sc5(f).
- (f) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load of 432 credits for the maximum period of registration specified in the curriculum regulations.
- (g) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits will be recorded on the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (h) Candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in Sc3, unless otherwise permitted by the Board of the Faculty.

## **Advanced standing**

**Sc6** Advanced standing may be granted to candidates in recognition of studies completed successfully in an approved institution of higher education elsewhere in accordance with UG2 of the Regulations for First Degree Curricula. Credits granted for advanced standing will be recorded on the transcript of the candidate but shall not be included in the calculation of the GPA.

#### Assessment

#### Sc7

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (d) Candidates are required to make up for failed courses in the following manner: repeating the failed course by undergoing instruction and satisfying the assessment, or for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (e) There shall be no appeal against the results of examinations and all other forms of assessment.

## Award of BSc Degree

- **Sc8** To be eligible for the award of the BSc degree, candidates shall have:
- (a) satisfied the requirements in UG5 of the Regulations for First Degree Curricula;
- (b) passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the major programme of the BSc degree curriculum.

#### **Honours classification**

## Sc9

(a) Honours classifications shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the Degree of BSc in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses, but not including courses approved by the Senate graded as 'Pass', 'Fail' or 'Distinction') carrying equal weighting:

Class of honours	<u>CGPA range</u>
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Cumulative GPA and the Board of Examiners for the Degree of BSc may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

# REGULATIONS FOR FIRST DEGREE CURRICULA

Regulations for First Degree Curricula (for students admitted under the 4-year '2012 curriculum' to the first year in the academic year 2017-18 and thereafter)

(See also General Regulations)

## **UG 1 Definitions:**

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An 'academic year' comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a 'summer semester' may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A 'summer semester' normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The 'maximum period of registration' is equivalent to a period which is 150% of the curriculum's normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

'Degree curriculum' means the entire study requirements for the award of an undergraduate degree.

'Major programme' means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

'Minor programme' means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

'Professional core' refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

'Course' means a course of study, with a credit value expressed as a number of credit-units

(The Regulations for First Degree Curricula applicable to cohorts admitted in 2012-13 and 2013-14 under the 4-year '2012 curriculum' can be found in the Calendar for 2013-14, and in the Calendar for 2014-15 for the cohorts admitted in 2014-15 and 2015-16.)

<sup>&</sup>lt;sup>1</sup> These regulations are applicable to candidates admitted from 2016-17 onwards to the first year of first degree curricula under the 4-year '2012 curriculum', the 2-year curriculum in respect of the BSc(IM), the 5-year curriculum in respect of the BA&BEd(LangEd), BEd&BSc, BEd&BSocSc, BSc(Sp&HearSc), and BNurs, and the 6-year curriculum in respect of the BChinMed, BDS and MBBS. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.

as specified in the syllabuses for a degree curriculum.

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major or minor programme or the professional core which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

'Elective course' or 'Elective' means any course offered within the same or another curriculum, other than compulsory courses in the candidate's degree curriculum, that can be taken by the candidate in order to complete the credit requirements of the degree curriculum.

'Capstone experience' refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

'Prerequisite' means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

'Corequisite' means a course which candidates must take in conjunction with the course in question.

'Credits' or 'credit-units' means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

'Grade Points' are standardized measurements of candidates' academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

'Grade Point Average' is a numerical measure of a candidate's academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The 'Grade Point Average' is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum_{i} Course \ Grade \ Point \times Course \ Credit \ Value}{\sum_{i} Course \ Credit \ Value}$$

(where 'i' stands for all passed and failed courses taken by the student over a specified period)

'Semester Grade Point Average' or 'Semester GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

'Year Grade Point Average' or 'Year GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

'Cumulative Grade Point Average' or 'Cumulative GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

'Graduation Grade Point Average' or 'Graduation GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the point of graduation. For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core courses with the highest grades (covering all four Areas of Inquiry), or all six

courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

'Assessment' refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of assessment activities which allow for such a judgment to be made. For the purpose of interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate, reference to 'examination' or 'examinations' in the Ordinance and the Statutes shall include and cover all forms of 'assessment' and its related processes.

A 'transcript' refers to a transcript of the record of study of a candidate, issued by the Registry of the University.

## **UG 2** Advanced standing:

Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

- (a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and
- (b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

## **UG 3** Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

## **UG 4** Progression in curriculum:

- (a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.
- (b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).

- (c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.
- (d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in the regulations of the degree.

## **UG 5** Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

- (a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English<sup>2</sup> and 6 credits in an English in the Discipline course<sup>3</sup>;
- (b) successful completion of 6 credits in Chinese language enhancement<sup>4</sup>;
- (c) successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>5</sup> with not more than 24 credits of course being selected within one academic year except where candidates are required to make up for failed credits; and
- (d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.
- <sup>2</sup> Candidates who have achieved Level 5\*\* in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.
- <sup>3</sup> (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.
  - (b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.
  - (c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.
- <sup>4</sup> Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.
- <sup>5</sup> Candidates registered for double degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.

## **UG 6 Exemption:**

Candidates may be exempted, with or without special conditions attached, from any of the requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

## **UG 7** Assessment:

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates suspended under Statute XXXI shall not be allowed to take, present themselves for, and participate in any assessments during the period of suspension, unless otherwise permitted by the Senate.
- (d) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (e) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:
  - (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
  - (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
  - (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
  - (iv) for elective courses, taking another course *in lieu* and satisfying the assessment requirements.
- (f) There shall be no appeal against the results of examinations and all other forms of assessment.

## **UG 8** Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows<sup>6</sup>:

Grade		Standard	Grade Point
A+	1		4.3
A	}	Excellent	4.0
A-	J		3.7
B+	1		3.3
В	}	Good	3.0
B-	J		2.7
C+	1		2.3
C	}	Satisfactory	2.0
C-	J	•	1.7
D+	1	Dogg	1.3
D	}	Pass	1.0
F		Fail	0

(b) Special permission may be given by Senate for courses in individual curricula to be graded as 'Pass', 'Fail' or 'Distinction'. Such courses will not be included in the calculation of the GPA.

#### **UG 9** Honours classifications:

(a) Honours classifications shall be awarded in five divisions<sup>7</sup>: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Graduate GPA scores, with all courses taken (including failed courses) carrying equal weighting which are proportionate to their credit values<sup>8</sup>:

Class of honours	GGPA range
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

(b) Honours classification may not be determined solely on the basis of a candidate's Graduation GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Graduation GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.

<sup>&</sup>lt;sup>6</sup> UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.

<sup>&</sup>lt;sup>7</sup> UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

<sup>&</sup>lt;sup>8</sup> For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core course with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

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# REGULATIONS FOR FIRST DEGREE CURRICULA

Regulations for First Degree Curricula (for students admitted under the 4-year '2012 curriculum' to the first year in the academic years in 2014-15, 2015-16 and 2016-17, and students admitted directed to the third year in the academic years 2016-17, 2017-18 and 2018-19)

(See also General Regulations)

## **UG 1 Definitions:**

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An 'academic year' comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a 'summer semester' may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A 'summer semester' normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The 'maximum period of registration' is equivalent to a period which is 150% of the curriculum's normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

'Degree curriculum' means the entire study requirements for the award of an undergraduate degree.

'Major programme' means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

'Minor programme' means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

'Professional core' refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

<sup>1</sup> These regulations are applicable to candidates admitted from 2016-17 onwards to the first year of first degree curricula under the 4-year '2012 curriculum', the 2-year curriculum in respect of the BSc(IM), the 5-year curriculum in respect of the BA&BEd(LangEd), BEd&BSc, BEd&BSocSc, BSc(Sp&HearSc), and BNurs, and the 6-year curriculum in respect of the BChinMed, BDS and MBBS. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.

(The Regulations for First Degree Curricula applicable to cohorts admitted in 2012-13 and 2013-14 under the 4-year '2012 curriculum' can be found in the Calendar for 2013-14, and in the Calendar for 2014-15 for the cohorts admitted in 2014-15 and 2015-16.)

'Course' means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major or minor programme or the professional core which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

'Elective course' or 'Elective' means any course offered within the same or another curriculum, other than compulsory courses in the candidate's degree curriculum, that can be taken by the candidate in order to complete the credit requirements of the degree curriculum.

'Capstone experience' refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

'Prerequisite' means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

'Corequisite' means a course which candidates must take in conjunction with the course in question.

'Credits' or 'credit-units' means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

'Grade Points' are standardized measurements of candidates' academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

'Grade Point Average' is a numerical measure of a candidate's academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The 'Grade Point Average' is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum\limits_{i}^{\Sigma} Course \ Grade \ Point \times Course \ Credit \ Value}{\sum\limits_{i}^{\Sigma} Course \ Credit \ Value}$$

(where 'i' stands for all passed and failed courses taken by the student over a specified period)

'Semester Grade Point Average' or 'Semester GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

'Year Grade Point Average' or 'Year GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

'Cumulative Grade Point Average' or 'Cumulative GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

'Assessment' refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of assessment activities which allow for such a judgment to be made. For the purpose of interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate,

reference to 'examination' or 'examinations' in the Ordinance and the Statutes shall include and cover all forms of 'assessment' and its related processes.

A 'transcript' refers to a transcript of the record of study of a candidate, issued by the Registry of the University.

## **UG 2** Advanced standing:

Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

- (a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and
- (b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

## **UG 3** Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

## **UG 4** Progression in curriculum:

- (a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.
- (b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).
- (c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.
- (d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The

number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.

- (e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in the regulations of the degree.

## **UG 5** Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

- (a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English<sup>2</sup> and 6 credits in an English in the Discipline course<sup>3</sup>;
- (b) successful completion of 6 credits in Chinese language enhancement<sup>4</sup>;
- (c) successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>5</sup> with not more than 24 credits of course being selected within one academic year except where candidates are required to make up for failed credits; and
- (d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.

## **UG 6** Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the

- <sup>2</sup> Candidates who have achieved Level 5\*\* in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.
- (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.
  - (b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.
  - (c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.
- <sup>4</sup> Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.
- <sup>5</sup> Candidates registered for double degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.

requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

## **UG 7** Assessment:

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates suspended under Statute XXXI shall not be allowed to take, present themselves for, and participate in any assessments during the period of suspension, unless otherwise permitted by the Senate.
- (d) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (e) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:
  - (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
  - (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
  - (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
  - (iv) for elective courses, taking another course *in lieu* and satisfying the assessment requirements.
- (f) There shall be no appeal against the results of examinations and all other forms of assessment.

## **UG 8** Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows<sup>6</sup>:

	Standard	Grade Point
1		4.3
}	Excellent	4.0
J		3.7
)		3.3
}	Good	3.0
J		2.7
)		2.3
}	Satisfactory	2.0
J	•	1.7
l	Dogg	1.3
5	rass	1.0
	Fail	0
	<pre>} } }</pre>	<pre> Excellent } Good Satisfactory } Pass</pre>

<sup>&</sup>lt;sup>6</sup> UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.

(b) Special permission may be given by Senate for courses in individual curricula to be graded as 'Pass', 'Fail' or 'Distinction'. Such courses will not be included in the calculation of the GPA.

## **UG 9** Honours classifications:

(a) Honours classifications shall be awarded in five divisions<sup>7</sup>: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses) carrying equal weighting:

<u>Class of honours</u>	<u>CGPA range</u>
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Cumulative GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

<sup>&</sup>lt;sup>7</sup> UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

# REGULATIONS FOR FIRST DEGREE CURRICULA

Regulations for First Degree Curricula (for students admitted under the 4-year '2012 curriculum' to the first year in the academic years 2012-13 and 2013-14, and students admitted directly to the third year in 2014-15 and 2015-16)

(See also General Regulations)

## **UG 1 Definitions:**

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An 'academic year' comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a 'summer semester' may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A 'summer semester' normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The 'maximum period of registration' is equivalent to a period which is 150% of the curriculum's normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

'Degree curriculum' means the entire study requirements for the award of an undergraduate degree.

'Major programme' means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

'Minor programme' means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

'Professional core' refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

(The Regulations for First Degree Curricula applicable to cohorts admitted in 2012-13 and 2013-14 under the 4-year '2012 curriculum' can be found in the Calendar for 2013-14, and in the Calendar for 2014-15 for the cohorts admitted in 2014-15 and 2015-16.)

<sup>&</sup>lt;sup>1</sup> These regulations are applicable to candidates admitted from 2016-17 onwards to the first year of first degree curricula under the 4-year '2012 curriculum', the 2-year curriculum in respect of the BSc(IM), the 5-year curriculum in respect of the BA&BEd(LangEd), BEd&BSc, BEd&BSocSc, BSc(Sp&HearSc), and BNurs, and the 6-year curriculum in respect of the BChinMed, BDS and MBBS. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.

'Course' means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major or minor programme or the professional core which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

'Elective course' or 'Elective' means any course offered within the same or another curriculum, other than compulsory courses in the candidate's degree curriculum, that can be taken by the candidate in order to complete the credit requirements of the degree curriculum.

'Capstone experience' refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

'Prerequisite' means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

'Corequisite' means a course which candidates must take in conjunction with the course in question.

'Credits' or 'credit-units' means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

'Grade Points' are standardized measurements of candidates' academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

'Grade Point Average' is a numerical measure of a candidate's academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The 'Grade Point Average' is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum\limits_{i}^{\sum} Course\ Grade\ Point \times Course\ Credit\ Value}{\sum\limits_{i}^{\sum} Course\ Credit\ Value}$$

(where 'i' stands for all passed and failed courses taken by the student over a specified period)

'Semester Grade Point Average' or 'Semester GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

'Year Grade Point Average' or 'Year GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

'Cumulative Grade Point Average' or 'Cumulative GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

'Assessment' refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of assessment activities which allow for such a judgment to be made. For the purpose of interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate,

reference to 'examination' or 'examinations' in the Ordinance and the Statutes shall include and cover all forms of 'assessment' and its related processes.

A 'transcript' refers to a transcript of the record of study of a candidate, issued by the Registry of the University.

## **UG 2** Advanced standing:

Advanced standing may be granted to candidates in recognition of studies completed successfully in an approved institution of higher education elsewhere. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

- (a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and
- (b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

## **UG 3** Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

## **UG 4** Progression in curriculum:

- (a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.
- (b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).
- (c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.

- (d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in the regulations of the degree.

## **UG 5** Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

- (a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English<sup>2</sup> and 6 credits in an English in the Discipline course<sup>3</sup>;
- (b) successful completion of 6 credits in Chinese language enhancement<sup>4</sup>;
- (c) successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>5</sup> with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits; and
- (d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.
- <sup>2</sup> Candidates who have achieved Level 5\*\* in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.
- (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.
  - (b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.
  - (c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.
- <sup>4</sup> Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.
- <sup>5</sup> Candidates registered for double degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.

## **UG 6** Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

#### **UG 7** Assessment:

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (d) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:
  - (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
  - (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
  - (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
  - (iv) for elective courses, taking another course *in lieu* and satisfying the assessment requirements.
- (e) There shall be no appeal against the results of examinations and all other forms of assessment.

## **UG 8** Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows<sup>6</sup>:

Grade		Standard	Grade Point
A+	1		4.3
A	}	Excellent	4.0
A-	J		3.7
B+	)		3.3
В	}	Good	3.0
B-	J		2.7
C+	1		2.3
C	}	Satisfactory	2.0
C-	J	·	1.7
D+	J	Dogg	1.3
D	ſ	Pass	1.0
F		Fail	0

<sup>&</sup>lt;sup>6</sup> UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.

(b) Special permission may be given by Senate for courses in individual curricula to be graded as 'Pass', 'Fail' or 'Distinction'. Such courses will not be included in the calculation of the GPA.

## **UG 9** Honours classifications:

(a) Honours classifications shall be awarded in five divisions<sup>7</sup>: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses) carrying equal weighting:

<u>Class of honours</u>	<u>CGPA range</u>
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Cumulative GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

<sup>&</sup>lt;sup>7</sup> UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

**Teaching Weeks** 

# SCIENCE

Teaching Weeks 2017-18 for Undergraduate and Taught Postgraduate Students

	SUN	MON	TUE	WED	THUR	FRI	SAT	FIRST SEMESTER: SEP 1 - DEC 23, 2017
						1	2	First Day of Teaching: Sep 1, 2017
GED 15	3	4	5	6	7	8	9	
SEP-17	10 17	11 18	12 19	13 20	14 21	15 22	16 23	
	24	25	26	27	28	29	30	
	1	[2]	3	4	[5]	6	7	
	8	9	10	11	12	13	14	
OCT-17	15	16	17	18	19	20	21	Reading/ Field Trip Week: Oct 16 - 21, 2017
	22	23	24	25	26	27	[28]	
	29	30	31	1	2	2	4	$\dashv$
	5	6	7	1 8	2 9	3 10	11	
NOV-17	12	13	14	15	16	17	18	
	19	20	21	22	23	24	25	
	26	27	28	29	30			Last Day of Teaching: Nov 30, 2017
			_	-	-	1	2	Revision Period: Dec 1 - 7, 2017
	3 10	4	5 12	6	7 14	8 15	9 16	Assessment Period: Dec 8 - 23, 2017
DEC-17	17	18	19	20	21	22	23	
	24	[25]	[26]	27	28	29	30	
	31							
		[1]	2	3	4	5	6	
	7	8	9	10	11	12	13	SECOND SEMESTER: JAN 15 - MAY 26, 2018
JAN-18	14	15	16	17	18	19	20	First Day of Teaching: Jan 15, 2018
	21	22	23	24	25	26	27	
	28	29	30	31	1	2	3	-
	4	5	6	7	8	9	10	Class Suspension Period for the Lunar New Year:
FEB-18	11	12	13	14	<15>	(16)	[17]	Feb 16 - 22, 2018
	18	[19]	$\bigcirc$ 20	(21)	22	23	24	
	25	26	27	28				
		_		-	1	2	3	D 11 / F 11 F 1 W 1 M 5 10 2010
MAR-18	4 11	5 12	6	7 14	8 15	9 (16)	10 17	Reading/ Field Trip Week: Mar 5 - 10, 2018
MAK-10	18	19	20	21	22	23	24	
	25	26	27	28	29	[30]	[31]	
	1	[2]	3	4	[5]	6	7	
	8	9	10	11	12	13	14	
APR-18	15	16	17	18	19	20	21	I I D CT 1: A 20 2010
	22 29	23 30	24	25	26	27	28	Last Day of Teaching: Apr 28, 2018
	27	30	[1]	2	3	4	5	Revision Period: Apr 30 - May 5, 2018
	6	7	8	9	10	11	12	Assessment Period:
MAY-18	13	14	15	16	17	18	19	May 7 - 26, 2018
	20	21	[22]	23	24	25	26	
	27	28	29	30	31		2	
	3	4	5	6	7	1 8	2 9	
JUN-18	3 10	4 11	12	13	14	8 15	9 16	
3011-10	17	[18]	19	20	21	22	23	OPTIONAL SUMMER SEMESTER
	24	25	26	27	28	29	30	JUN 25 - AUG 18, 2018
	1	[2]	3	4	5	6	7	
	8	9	10	11	12	13	14	
JUL-18	15	16	17	18	19	20	21	
	22	23	24	25	26	27	28	
	29	30	31	1	2	3	4	$\forall$
	5	6	7	8	9	10	11	
AUG-18	12	13	14	15	16	17	18	
	19	20	21	22	23	24	25	
	26	27	28	29	30	31		
[] General Ho	liday				Reading/ F	ield Trip	Week	

Week

2 3 Break

Break Break Break 1 2 3 4

> 6 7 8

[ ] General Holiday Reading/ Field Trip Week

( ) University Holiday (Full Day) Revision Period

<> University Holiday (afternoon only) Class Suspension Period for the Lunar New Year

Assessment Period

Useful contacts and websites

# SCIENCE

# Useful contacts and websites

Faculty of Science Office Location : Ground Floor,

Chong Yuet Ming Physics Building

Tel : 3917 2683
Fax : 2858 4620
Email : science@hku.hk

Website : http://www.scifac.hku.hk

(Please visit <a href="http://www.scifac.hku.hk">http://www.scifac.hku.hk</a> for the latest updates of BSc courses, timetables, notices and forms)

**Departments/School** 

Biological Sciences Website : http://www.biosch.hku.hk
Biomedical Sciences Website : http://www.sbms.hku.hk
Chemistry Website : http://www.chemistry.hku.hk
Earth Sciences Website : http://www.earthsciences.hku.hk

MathematicsWebsite: http://www.math.hku.hkPhysicsWebsite: http://www.physics.hku.hkStatistics and Actuarial ScienceWebsite: http://www.saasweb.hku.hk

Academic Advising Office Tel : 2219 4686

Website : http://aao.hku.hk

Academic Services Office Office Location : G04, Run Run Shaw Building

Tel : 2859 2433
Fax : 2540 1405
Email : asoffice@hku.hk
Website : http://www.ase.hku.hk

Common Core courses Website : http://commoncore.hku.hk

**HKU Worldwide Undergraduate** 

**Exchange Programme** 

Website : http://www.als.hku.hk/admission/exchange

Centre of Development and Tel : 2859 2305

Resources for Students (CEDARS) Website : http://cedars.hku.hk

University Health Service Tel : 2859 2501 (General enquiries)

2549 4686 (Medical appointments only)

Website : http://www.uhs.hku.hk

Plagiarism Website : http://www.hku.hk/plagiarism